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ABSTRACT

A study was conducted to identify the current needs of truck mechanic apprenticeship training programs, the problems experienced in these programs, and possible solutions to these problems. Research data was collected by the following methods: A questionnaire was completed by operating and maintenance people in the trucking industry in the Chicago metropolitan area; current literature on new methods as well as old in the solution of truck apprentice mechanic training were reviewed; and current regulations of apprentice mechanic training in conjunction with trucking associations, mechanics' unions, and federal and state regulating bodies were reviewed. Five areas of need which have caused problems when unfulfilled were identified as (1) economic conditions that determine the need for apprentices, (2) training facilities that are available and readily accessible to the apprentice, (3) willingness on the part of dealer management and the shop mechanics to take time to teach the apprentice, (4) willingness of the dealer to hire a man less qualified than a journeyman mechanic, and (5) willingness of the mechanics' union to encourage apprentice training in spite of recession in business. A recession-proof system, which includes a built-in reservoir of qualified in-training apprentices, is proposed. (The effects of such a system are discussed and further recommendations are given.) (BM)

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CHICAGO STATE UNIVERSITY

TRUCK MECHANIC APPRENTICE TRAINING

A TWO COURSE OPTION PAPER
PRESENTED TO
THE FACULTY OF THE OCCUPATIONAL EDUCATION DEPARTMENT

IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE
MASTER OF SCIENCE IN EDUCATION DEGREE IN
INDUSTRIAL EDUCATION

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BY
HENRY R. CERNOTA
AUGUST 1975
CHICAGO, ILLINOIS

PREFACE

My purpose in writing on the subject of Truck Mechanic Apprentice Training is to try to bring together some of the loose ends of training mechanics that have been dangling and need to be joined together. I have attempted to gain understanding by drawing on the expertise of midwest truck equipment maintenance superintendents; getting their frank, expert opinions on their training programs and how they view some advance aspects of training coordination.

I hope to help the truck maintenance field. I have been involved in it for many years and have met up with capable and devoted maintenance men. The purpose of historical references is to give a background to the presently clouded, changing panorama of truck mechanic training. The effect of the economy periodically disrupts worthwhile training programs that need stability to survive.

I wish to acknowledge: the patient understanding and help of my wife Elsie and son and daughter Bill and Bets who made the way smoother; the help, criticism, and encouragement of Dr. Norman Laws and Dr. Joseph Rathnau of the Occupational Education Department of the Chicago State University; the final typing in Turabian fashion by JoAnne Smith, who faced an emergency short notice and completed the typing in record time. Words can't truly express the gratitude and feeling in the completion of this paper.

3

CONTENTS

Page

PREFACE ii

Chapter

I. THE ISSUES. 1

Introduction. 1

Supplying Truck Mechanics 2

The Major Problem of Training Truck Mechanics 5

Definition of Terms 6

Significance of the Problem 9

A Case for Vocational Training. 10

Career Dilemma. 13

Additional Problems and Their Solutions . . 16

Limitations of Program Development. 22

Research Methods. 23

Summary 25

II. THE HISTORICAL BACKGROUND 27

Introduction. 27

Manufacturers in the Trucking Industry. . . 30

The Appearance of Trucks. 30
Ford Motor Company. 31
Mack Company. 33
Dodge Brothers Company. 34
White Motor Corporation 35
General Motors Truck Company. 36
Packard Motor Company 36
International Harvester Company 37

Page

The Truck Users 38
  Railway Express, R. E. A. Express 39
  Arthur Dixon Transfer Company 41
  The Willett Company 44

Early Attempts at Training. 47
  Post World War I Period 47
  Early Truck Mechanic Training 48
  Apprentice Training Solves Manpower Shortage. 50
  Selection Standards 51

Formalized Training Programs. 52
  Factory Schools . . . .
  Public School, Related Supplementary Training. 53
  Private Technical or Trade Schools. . . . 54

III. CONTEMPORARY SOLUTIONS. 59

The Need for Craftsmen. 59
SENA (National Apprenticeship Service of Columbia) 62
Apprenticeship and On-the-Job Training. . . 65
The Role of the Service Department. 71
Leave Room for Learning 73
Survey Questionnaire. 75

IV. RECOMMENDATIONS 102

V. SUMMARY 109

VI. APPENDIX. 110

VII. BIBLIOGRAPHY. 138

I. THE ISSUES

Introduction

Supplying Truck Mechanics

The Major Problem of Training Truck Mechanics

Definition of Terms

Significance of the Problem

A Case for Vocational Training

Career Dilemma

Additional Problems and Their Solutions

Limitations of Program Development

Research Methods

Summary

TRUCK MECHANIC APPRENTICE TRAINING

I. The Issues

Introduction

The placement of the career-minded person in the role most beneficial and rewarding to himself, industry and society has had many frustrations. The career of the apprentice truck mechanic, even though of relatively recent vintage, has many historical precedences. Examination and re-examination of teaching and training methods are a continuous process. It takes considerable expertise to meet the demands of industry's highly complicated equipment and service problems. Add to this the needs for safety, economy and a minimum expenditure of time. All these must be achieved under training conditions that are not subject to the whims of the market place.

The use of a survey of opinions by a group of operating people in truck service facilities and the graphing of questionnaire results seeks to give a picture that helps explain some present practices.

The role of the writer in this paper was to compile historical precedences, examine present-day practices, reflect on personal experiences, and then formulate pertinent recommendations in the continually changing trucking service industry.

Supplying Truck Mechanics

Initial employment in the industrial business world represents a great change for an individual and requires extensive adjustment. To meet the needs of new employees, many employers found that they needed to devise specific training programs. Industry has been compelled to help train the formally-educated person. As the technological needs created by the ever-expanding industrial complex grew, the proportional needs for trained manpower grew. Industry has demanded standards of skill, ability and knowledge that the inexperienced employee often was hard pressed to meet.

Much thought has gone into the training of the new employee and his problems. The eminent philosopher Plato stated that the business of education is to discover what each person is suited to do and to train him to master his ability.[1] Fortunate indeed is the young person who has unreservedly and unfalteringly pursued his life work as determined by himself with the help of his high school training. It would indeed be an unusually fortunate condition if industry were ready to further train and bolster the previous education of the newcomer for the industrial world's needs. This would require an unusual training program--unreserved, and honestly organized to properly train for mature development of skills and abilities. This ambitious, necessary and desirable type of training has been sought for many years by various craft and industry-related training program directors.

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[1] John Dewey, Democracy and Education (New York: Macmillan Co., 1931), p. 102.

Erratic pulsations of the business cycle involving economic expansion and retrenchment often dictated the critical terms for training programs. The high economy cycle allowed the advancement and implementation of the programs while, paradoxically, the low business cycle caused economic abandonment of them in a highly competitive industry. The abandonment took place even though training programs were fully planned and most needed for mutual advantage to industry, the trainee and society itself. Fortunate has been the applicant apprentice who was in the right place at the right time, even though his qualifications might have been limited.

Effects of business cycles on the reluctance of the trucking industry to participate fully in establishing these necessary training programs for truck mechanic apprentices can be attributed to the high level of competition in the industry. Thus, application of successful methods from less competitive industries would create an operating training program when the business cycle was high and result in a liability when the economic pendulum was on its way down. One of the cardinal rules in business has been,"not to give the competitor an advantage." In a highly competitive industry, such as trucking, this advantage may determine survival.

As time passed, the trucking industry was faced with more and more complex equipment and more stringent legal requirements as to performance ability. As to effects on the ecology of the total environment, it found itself faced with many technical problems without easy solution. Advanced technology for maintenance of trucking equipment has required skilled, highly-knowledgeable abilities and continued and responsible application of electronics, physics, mechanics, chemistry, electricity, hydraulics and metallurgy. An understanding of business economics applied to everyday needs was also an important point for survival in the field of moving commercial merchandise along the highways from manufacturer's sources to the ultimate user.

By 1974 the trucking industry employed almost ten million people and used almost twenty-four million trucks. One vehicle in five was a truck. Truckers paid a third of the taxes collected for highway use. Trucks hauled 51 percent of manufacturers' inter-city tonnage.[2] Within this movement, proper coordination of equipment realized substantial savings as well as safety, convenience, and timeliness to the public. Also within the area of this transportation marvel was found a segment of its success as well as its possible failure. This important aspect included the providing of skilled manpower to service, maintain, repair, and trouble-shoot equipment in the field. Redesigning the complex technical equipment was necessary to meet the higher standards of operational requirements and the many legal and safety regulations. Thus, the need for skilled truck mechanics increased as the demands on the industry increased. Because of safety regulations, complexity of equipment and increasing operational speeds, a training program is an integral part of the trucking industry's future.

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[2] Motor Vehicle Manufacturers' Association, 1975 Automobile Facts & Figures (Detroit, Michigan: pp. 4, 24, 54, 58, 69).

The Major Problems of Training Truck Mechanics

The problem is, has the trucking industry taken full advantage of the truck mechanic apprentice training program? There will not be a clear and concise answer to this question because of the many variables in individual attempts to arrive at specific answers to the needs of each and every trucking company's training programs. The problem has great latitude and depth. The trucking industry, even in its use of the term "mechanic," has had a fairly wide definition in its application and thus in training requirements.

In posing the problem, a question for further explanation is presented: whose training program? We must reflect on the continuing efforts of the U.S. Department of Labor, Bureau of Apprenticeship, which has modestly stood in the background, nurturing various attempts at solutions which sometimes did not gain acceptance into the industry or the economics of the time.

An understanding sometimes involves research into what has been done, what is being done and what should be done within the limitations of the study and available information. The usual approach to training has limitations because of continuing and constant changes in the automotive and trucking industry. Many factors--economic, sociological, industrial and educational--contribute to varying an already changeable solution whose setting qualities are not firm.

Definition of Terms

Definitions of key words are important to establish common grounds for understanding Truck Mechanic Apprenticeship Contracts. Agreements are based on understandings by all parties concerned in view of the more legalistic approach in our interchanges in the business world. Definitions of words that might be in contention must be specific to avoid misunderstanding and sometimes even deliberate twisting of meaning to advantage. Definitions in some areas must be general and flexible in order not to exclude some of the undreamed possibilities that may later add to a more viable program agreeable to all.

1. Apprentice--a person who has signed an apprenticeship agreement with the employer to learn the skilled trade outlined in the standards.[3]

2. Apprenticeship Agreement--the written agreement executed by and between the apprentice and his employer or the employer's agent and approved by the local joint apprenticeship committee. It shall contain the terms and conditions of the apprenticeship. The use of the apprenticeship agreement is for conformance of apprentices and does not nullify or supersede the bargaining agreement.[4]

3. Apprenticeship Program or Standards--the document which embodies the procedure for the selection and training of apprentices, setting forth the terms and conditions associated therewith, including wages, hours, conditions of employment, training on the job and related instruction. The duties and responsibilities, including administrative procedures of the local committee, shall also be set forth in the program or standards.[5]

4. Apprenticeship--training for those occupations commonly known as skilled crafts or trades that require a wide and diverse range of skills and knowledge, as well as maturity and independence of judgment. Apprenticeship provides a job at the same time that it maintains a long term program. Most apprenticeship programs outline a four year curriculum of on-the-job experience and related instruction.[6]

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[3] U.S. Dept. of Labor, Apprenticeship Standards for Truck Mechanics, National Trucking Industry, National Standards of American Trucking Association and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America. (Washington, D.C.; American Trucking Assoc., 1970), pp. 1, 2.

[4] Ibid.

[5] Ibid.

[6] U.S. Dept. of Labor, The National Apprenticeship Program (Washington, D.C.; Government Printing Office, 1965), p.2.

5. Apprenticeship Term--the normal term of apprenticeship shall not be less than that required to become a competent journeyman at any particular branch of the trade.[7]

6. Apprentice Qualification--applicants for apprentice openings shall meet the requirements as established by the Joint Apprenticeship Committee.[8]

7. Association--The American Trucking Association, Inc.[9]

8. Employer--any firm by which the apprentice is employed that has contractual relations with the union, either directly or through an association.[10]

9. Local Committee--the Joint Apprenticeship Committee representing the Union and the Employer(s) which shall develop and administer the local apprenticeship program.[11]

10. National Committee--the National Joint Apprenticeship Committee representing the International Association of Machinists and Aerospace Workers AFL-CIO, and the American Trucking Association, Inc., which shall promote and administer the national apprenticeship program. They shall provide advice, service, and assistance to the local joint apprenticeship committees.[12]

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[7] International Association of Machinists and Aerospace Workers, *Apprenticeship Policy Manual* (Washington, D.C.: I.A.M. Publication, 1970), p. 11.

[8] *Ibid.*

[9] *Ibid.*

[10] *Ibid.*

[11] *Ibid.*

[12] *Ibid.*

11. Registration Agency--The Bureau of Apprenticeship and Training, U.S. Dept. of Labor, or a state apprenticeship agency recognized by and conforming to the standards established by the Federal Committee on Apprenticeship.[13]

Significance of the Problem

United States Presidents have often pointed out directions and fields of concern to correct some of our educational problems. Here are some of their concerned and pointed presentations:

> The basic purpose of our vocational education effort is sound and sufficiently broad to provide a basis for meeting future needs. However, the technological changes which have occurred in all occupations call for a review and reevaluation.[14]
>
> If we are learning anything from our experience, we are learning that it is time for us to go to work, and the first work of these times and the first work of our society is education.[15]
>
> Apprenticeship is one of the best systems for training craftsmen, who are a highly regarded and prized national resource, one deserving of the highest respect.[16]

A sufficient number of well-trained people is needed in the maintenance of truck equipment. The number of trainees should be determined to meet the needs of the industry, to stabilize the trainee output and to bridge the highs and lows of business cycles so that trainees can complete their goals. In an industry that needs 1,000 trained men, training programs should start with about 2,200 apprentices, since according to statistics only 46 percent will complete their training. Lowering of training standards is not the logical way to increase the numbers of apprentices and only leads to a deterioration of the training.

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[13] *Ibid.*

[14] John F. Kennedy, February 20, 1961.

[15] Lyndon B. Johnson.

[16] Richard M. Nixon, March 17, 1970.

A Case for Vocational Training

Thus, logically, the training burden should fall on the schools to help screen, train, and meet the standards and demands of industry. Industry is paying a high tax and realizing a minimum of help with its problems. This minimum of help is not due to the lack of attempts to help on the part of vocational education; rather, education has been waiting for the participation and needed direction by the Trucking Industry. Vocational education has been forced to go it alone in many instances with resultant criticism for shortcomings. Many past programs could have been successful if coordinated help and directives had been sent in by the Trucking Industry. Part of the fault lies with the Trucking Industry's reluctance to give of its time and knowledge to help establish goals, needs and programs. This type of business does not obtain the educational system's help by ignoring its needs for direction. Only when a realization takes place will a joint involvement be a matter of course. A well-laid-out program with full participation by both and with continuing advisory help will result in benefits to all, even those already in the industry and those whose work is becoming obsolete.

An example of the need for communication lies in the selection of a profession. Selection by students of careers has been a problem in which the schools can be the most helpful. The students' performance records, aptitude indicators and vocational interests are available in school records which are kept within the school system. Much better use of this information could be made for guiding students into apprenticeship programs.

Results of the Truck Apprentice Mechanic training programs have ranged from successful to unsuccessful, depending on the time, the need and the economic problems. A leveling of the ups and downs of supply and demand, so dependent on the market conditions of the highly competitive field of trucking, could lead to a steady output of needed mechanics. However, without the leveling of this up-and-down curve the condition of feast or famine will continue in the industry which must be relied upon to train its own. Therefore, a need for a plateau in this variable curve is necessary to provide stability and a worthwhile and constructive program objectively presented to realize maximum results from minimum expenditures in youth, time, equipment, training manpower and facilities. A steady and needed output should be sought to meet the industry's requirements. How to achieve this has been a knotty problem for many.

Only a realization on the part of the industry's knowledgeable management working in conjunction with the technically-oriented schools which place technology above academics can succeed. Without ability to service equipment there is no need to design and manufacture it to become sophisticated liabilities or "white elephants." Trucking industry growth has had a continuous demand for manpower and has been able to assimilate large quantities of undertrained manpower that learned as they earned. To have stability we must determine goals:

1. Steady flow of well-trained manpower.
2. Standards that industry accepts and the student can meet.
3. Cycle-proof programs that will survive the ups and downs of the business world that so sensitively affect the economics of the trucking industry.

In the past much of the manpower loss has been to industries with a leveled business-cycle curve that is more insensitive to the ups and downs of the economic cycle. Tying in manpower training expenditures to current trucking industry revenues often has dried up training programs. Return on investment in training is a long-term investment, even though blue chip.

Often the trucking industry has resorted to deferred maintenance when its business decreases or revenue is down. This means that a chance is being taken on the important safety item that is reliability. Deferred maintenance means only "must" items are taken care of; however, the overlooking of safety items can take place that ordinarily would have been revealed at the normal preventive maintenance period. Thus, it can be seen that the effect and influence of the cyclic pulses in the trucking industry demand a continuous review of costs, manpower utilization, equipment purchases, taxes, license fees, maintenance materials, and insurance and liability problems.

Career Dilemma

Factors that frequently affected the decision of the young man in his career selection were parental attitudes, high school guidance and counseling, peer pressures, status seeking, and a fast return in dollars to meet the young man's ballooning expenses and need for freedom from apron strings for financial independence. Each of these factors can be discounted and shown unimportant in relation to the overall process of proper career selection. However, collectively they assume pressures that have and mean much to the young person at the fork in the road to his career selection. Who is to tell the young man that a technician's career is more worthwhile in terms of success than that of the engineer's career? The state of the art of career counseling shoots for the stars, hoping that the counselees fall in between in their career selection. Who is there to tell the twenty-five or thirty-year-old frustrated college drop-out that if he had gone into sales or law instead of technology and engineering he would have succeeded?

Too much of career counseling is slanted at the troubled young people and not at the greater number of normal average I.Q. Is not career selection a troublesome problem and of most importance to all? Many young people have become lost in career selection and float on into college courses because it is the "thing to do." Perhaps the factors, methods and items applied in the selection of the area of endeavor or world of work should be scrutinized. The potential engineering candidate should have a greater taste of shop work (perhaps in industry co-op courses) early in the high school program. When he gets his high school diploma he should have skill, ability and technical knowledge in addition to academic knowledge and niceties. Young men used to work with their fathers in practical projects. Today the urbanized society is too busy for the young man to assist his father in projects that help develop likes, skills, and vocations.

Resentment against accepted training for the truck mechanic apprentice and against attempts at short-term training programs has added to the confusion. The ability of the average trainee and the length of time needed to properly train him to become a full-fledged journeyman are variables that must be considered with sufficient flexibility to allow for experiences, knowledge and maturity.

Continuous negation of training programs by academicians has constantly deprived the high school student. Substitution of academic subjects for the pragmatic has taken away substance from the practical. However, the indigestibility of the "enriched" substitute for vocational skill training is borne out by statistics that show 80 percent of the present high school graduates find their life's work without further formal training. A national average shows that only 20 percent gain baccalaureate degrees. This leaves industry to do its own training, limiting the field to a needed minimum and a minimum expenditure. This also may deprive the young adult of the challenge to achieve in his selected field, especially in periods of economic stress. The needs to be challenged and to taste the major field of work are possible only in an atmosphere in which our high schools can provide the pre-employment experiences necessary for the all-important decision of a life-time career.

Additional Problems and Their Solutions

Has the trucking industry taken full advantage of the truck apprentice mechanic training program? Facilities are available which, with some expansion, coordinated direction, and an active and continuing interest on the part of the trucking industry, could be applied to the solution of the apprentice mechanic need. How to achieve the solution perhaps has its beginning in the sub-questions: How is it being done now? What should be done?

The need for solution of the problem is expanding as more complicated handling and transportation equipment is developed. Large scale volume carriers, extreme loadings, high speed schedules, ecological problems, and a continuing change in applied technology and engineering are important factors. The fast and safe movement of modern vehicles on our high speed expressways is totally dependent on the knowledge, ability, skill, and care of the maintenance mechanic backed up by a continuing upgrading of skills program. It is becoming more critically important that trained manpower be available at the point of need; otherwise the level of safety deteriorates, economy goes out, progress and improvement stand still because of lack of technical skill to carry out the qualities that give us safe, economical, and fast transportation.

The context of the problem is one of great movements in our social and industrial progress which have followed certain phases dictated by the well-being of the economy. Expansion progressed first industrially, then much more slowly sociologically: the struggle for the rights of man, movements in the education of the young and, finally, the training of the apprentice.

A problem whose solution is needed by two parties, industry and union management, each of which has a suspicion of the intentions of the other, cannot be easily resolved. Alternately trading positions on their desires, each one holding itself at a distance too great to reach a mutual understanding, causes a problem of trust which can only be solved by the use of a third party. However, this third party may find itself in an untenable position and its samaritanism under suspicion. It becomes a retreat to a hands-off-and-wait-and-see situation as the only way out. Resistance to change is also a human weakness adding its weight to that process of merely going through the motions of a solution, raising insurmountable hurdles to a final answer. This has been the situation in the Truck Mechanic Apprentice Training area.

Logically, the third party to the solution of the Truck Apprentice Mechanic training problem is the Bureau of Apprenticeship, U.S. Department of Labor.[17] The background work in other successful apprentice training programs, such as in the machine trades and plumbing trades, has realized a substantial number of well-trained men for those industries on whose programs the Bureau of Apprenticeship has served as the third party. To oversee, suggest possible changes, and to smooth the process with a minimum of interference in the actual operation of the Training Program has been the area of service where the Bureau of Apprenticeship has performed. Government involvement as well as other solutions are suggested in the historical section of this paper.

In the past, how did industry go about getting this trained, skilled, knowledgeable, and devoted man? Enlightened industries with greater needs soon set up their own training programs. Others with lesser conscience enticed skilled workmen with "above scale" pay rates, better conditions, and better fringe benefits while taking full advantage of their competitors' training programs without the necessary training investment. In this fashion many good training programs found themselves in difficulty due to the demands of competition for their graduated trainees. In the trucking industry where there is an extremely high competitive condition plus a high sensitivity to economic conditions this offering of "over-scale rates" to the mechanic rapidly discouraged any extensive training programs. Even the practice of importing truck mechanics from Europe had serious drawbacks. These skilled European mechanics, after six months of required service with their sponsor, soon sought more attractive opportunities instead of having to contend with seniority lists before they could go on day shifts or achieve other seniority discriminants such as type of work, vacations, extra work, and advancement. These opportunists soon discouraged the use of this means of obtaining trained manpower.

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[17] U.S. Department of Labor, "Apprenticeship Coordinators," Washington, D.C.; Bureau of Apprenticeship Pub., 1970, preface.

The entire field of truck mechanic apprentice training periodically goes through reverses in methods and practices. It is a frustrating experience for the participants who would like to see it move in an orderly fashion. However, business economics, practices in the industry, and the highly competitive nature of the trucking industry casts its heavy influence on the training programs. Perhaps a way out would be to neutralize somehow the effects of the business cycle and competition--sensitivity in the training program. The difficulty in doing this is expressed well in the following:

> The dropout rate of apprentices is high. Apprentices in the United States are older with more family responsibilities than their European counterparts. They are prone to choose higher present income in a semi-skilled job over the delayed higher long

> term income of a skilled craftsman. Incumbent journeymen have a built-in fear of labor surpluses and see apprentices as potential competitors... Employers, particularly small ones in industries where employment relationship is casual, are reluctant to undertake the expense of training with no assurance that the trained workman will stay in their employ.[18]

A truck mechanic apprentice training program that was immune to economic cycles was a necessity in the trucking industry as proved by past performances. The achievement of a business cycle proof program could only be realized by the wholehearted cooperation of all parties: the trucking industry, potential truck apprentice mechanics, public school systems, factory and factory training programs, U.S. Department of Labor, various taxing bodies, and finally society itself. To further continue the exploration is the only way. This can be broken up into areas:

1. A formally instituted program for training apprentice mechanics as prescribed by the regulations and standards developed by the American Trucking Association, International Association of Machinists, and the U.S. Department of Labor.
2. Private arrangements and agreements within trucking companies, factories manufacturing

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[18] 88th Congress - 2nd session, The Role of Apprenticeship in Manpower Development: United States and Western Europe, Sub-Committee on Employment and Manpower of the Committee on Labor and Public Welfare, United States Senate (Washington, D.C.; Government Printing Office, 1964), p. vii.

equipment, and various service facilities for a training program with agreements for graduation to journeyman truck mechanic after a specific training period.

3. Job skip training--where the learner moves from job to job, gaining skills until finally his abilities are recognized and he is given the classification of mechanic arbitrarily by his employer. In some cases the man applies for work carrying the title of mechanic and if he does qualify, assumes the classification. In many instances in non-union shops the area of helper, technician, and mechanic is poorly defined and has led to variable rates, fringe benefits, and type of work responsibility, determined by semantics and internal politics rather than abilities. The latter area has often created sources of dissension within, that frequently discourage continuation of the apprentice mechanic training. "Fifty percent of mechanics have learned their trade by job skipping." A rule of thumb statement, generally held as true.

To achieve this neutralization and control of the causes of instability may take an innovative approach; however, there is a way that has been ignored or left unnoticed. This method, training trust fund[19], has had some noticeable success in other industries where it is being used. In conjunction with the greater attention to vocational training and some subsidy, this training trust fund could possibly overcome the industry's reluctance to take on programs that may be a liability. A code of ethics on the part of industry would be helpful to establish participating members of all trucking companies in the training program. A paradox has arisen: high unemployment and shortage of skilled manpower. The above is one possible solution.

Limitations of Program Development

The reluctance of the trucking industry in the past to participate in the establishment of necessary and needful training programs can, as stated, be attributed to the high level of competition that exists in their field and, in turn, the extreme sensitivity with which it follows the ups and downs of the business cycle. Thus, to apply successful methods from industries that are on a less stringent competitive basis can only mean a going program when the cycle of high-level economy is present and a flop when the economic pendulum is moving down.

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[19] National Labor Relations Board, Labor Management Relations Act as Amended by Public Law 86-257, 1959 Public Law 101-80th Congress, p.24.

The trucking industry must, therefore, achieve a more practical program through the wholehearted cooperation of all parties: the trucking industry, potential truck mechanic apprentices, public school systems, public, factory and factory training centers, U.S. Department of Labor, various taxing bodies to fund programs paid for but not obtained by the Trucking Industry through its many taxes. This would be the ultimate in simplification of a many-faceted problem. In this dissertation one facet of the problem which has been explored is as follows:

> Has the Trucking Industry taken full advantage of the Truck Mechanic Apprentice training program? Only if it is fully utilizing what it already has can it move ahead and demand more.

Research Methods

Individual thought of men responsible for maintenance of trucking equipment, their personal reactions to a questionnaire covering important questions on selection, training, and success with training of truck mechanic apprentices, will be covered. The study will be limited to the Chicago metropolitan area, which may be taken as representative of the middle west of the United States.

The members of the organization to be studied operate, are responsible for, and maintain truck trailer, passenger car, and off-the-road vehicles amounting to approximately 100,000 vehicles. The organization is known as The Automotive Transportation Supervisors' Association of Chicago which formerly met monthly at the Chicago Engineers' Club, 314 South Federal Street, Chicago, Illinois (they now meet monthly in Oakbrook, Illinois). Some large truck fleets represented in the membership are as follows: U.S. Post Office, R.E.A., United Parcel, Ryder System, Bell System, Commonwealth Edison Co., Peoples Gas Co., Willett Trucking Co., Burlington Transportation Co., Leaseways Co. Signal Delivery Service, Chicago Fire Department, Chicago Police Department, Phillips' Petroleum Company.

Limitations of the research will be within the scope of:

1. A questionnaire to operating and maintenance people in the trucking industry in the Chicago metropolitan area.
2. Research of current literature on new methods as well as old in the solution of truck apprentice mechanic training.
3. Research of current government regulation of apprentice mechanic training in conjunction with trucking associations, mechanics' unions, and federal and state regulating bodies.

4. Proper weight to answers.
5. Truth of the answers in sensitive areas.

Summary

The following points have been examined, and their achievement would be most helpful in the training of the apprentice truck mechanic:

(1) Training programs should be continuous without being subject to changes in the economy. A good analogy is the four-year high school academic program which continues without interference from business cycles.

(2) The trucking industry must get involved in setting up continuing programs for training apprentices with a realistic output to meet the needs.

(3) The trucking industry should establish ethical standards in training apprentices.

(4) Industry must use better screening techniques to help candidates select careers best suited for their abilities and desires.

(5) The trucking industry must explore holding areas for graduates to continue to upgrade their post-graduate training.

(6) The trucking industry must meet and work with post-high school educational facilities of the community. There is an urgent need for their input.

II. THE HISTORICAL BACKGROUND

Introduction

Manufacturers in the Trucking Industry

The Truck Users

Early Attempts at Training

Formalized Training Programs

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Manufacturers in the Trucking Industry

The Truck Users

Early Attempts at Training

Formalized Training Programs

II. THE HISTORICAL BACKGROUND

Introduction

In the past, various trades and crafts have used apprentice training programs that traditionally owed some of their beginnings to the medieval guilds with some of their philosophy going as far back as the dawn of written history. The Code of Hammurabi credited to Hammurabi, King of Babylon, B.C. 2285-2242, is an example of detailed references made concerning work, wages, conduct, and penalties--almost so well developed that even at that time there must have been previous use of innovative regulations and experience opportunities that had been lost or unrecorded. Briefly, it was found in the Code as follows:

> If an artisan has taken a son to bring up, and has caused him to learn his handicraft, no one has any claim.
>
> If he has not caused him to learn his handicraft, that nursling shall return to his father's house.[20]

Thus is seen the timeless importance of the artisan and his exclusive rights for teaching the mysteries of his art to the young. Moving ahead to the Middle Ages, the strength, direction, and training in the arts were under control of the Guilds. Their influence, because of their cooperative ventures of that time, set the patterns of training that today find similar names and training experiences. Journeymen were to travel and learn by experience in differing conditions of employment and skills. The Guilds played an important part in the Middle Ages as mechanical fraternities of the arts. The Guilds developed by-laws and had rules for the training of apprentices, the practice of one's trade as a journeyman in different towns, and the requirements of a master.[21]

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[20] C. H. W. Johns, The Oldest Code of Laws in the World (New York: Chas. Scribner and Sons, 1926), pp. 188, 189.

In England, the Guilds had minimal legal rights to trade practices. However, the "Statute of Elizabeth, requiring seven years of apprenticeship,"[22] stands as one of their achievements. The development of machinery in the 18th Century tended to break up the Trade Guilds in all the European countries. Workmen fought the introduction of machinery which reduced hand labor. Employers naturally brought in outside workers to operate the machinery and were able to manufacture and sell at a lower price. Many fights and riots took place over the use of machinery. Gradually, the strength of the Guilds declined until the use of machinery was accepted and brought into the sphere of the Guilds. The modern labor movement came into being from this development; and labor unions, as they are known today, came into being.

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[21] "Labor Movement in America," Encyclopedia Americana, 1949, Vol. XVI, p. 603.

[22] "Guilds," Encyclopedia Americana, 1949, Vol. XIII, p. 535.

Consequently, the early years of the "horseless carriage" involved many innovators, inventors, tinkerers, opportunists, prophets, craftsmen of many industries, patent seekers, and business promoters. All of these fused and formed a conglomerate of many of the crafts which have become today's mechanic and "Doctor of Motors" plus. The necessary training of this unique professional could be compared to that of the physician who must have a thorough understanding of the functions of the two models, male and female, of the human race and all of their fallibilities if he is to be a general practitioner. Compare this to the needed training of the general practicing mechanic who services many models of automotive equipment that annually seem to procreate themselves in a never-ending model diversification. The statement, "In the Automotive Industry there is nothing as constant as Change,"[23] is very appropriate.

In the past, industries in the United States have been wasteful of the ever-abundant natural resources, which practice was even carried over into the use of its manpower resources. These manpower resources had seemingly always been sufficient to meet the needs. However, with the demands of complicated devices and equipment for service and maintenance, merely supplying a man was not the answer. As a result of these manpower practices, a paradox arose as industries found themselves with high unemployment and a shortage of skilled manpower. Unless the man was trained, knowledgeable, skilled, experienced, and devoted to the needs and ways of the devices and equipment that had to be kept in the best operating condition, these would soon be inoperative. A sophisticated piece of machinery quickly becomes a liability if it does not function as it was originally designed to do.

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[23] T. A. Boyd, Professional Amateur: Biography of C.F. Kettering (New York: E. P. Dutton and Co., 1957), p. 215.

Manufacturers in the Trucking Industry

The Appearance of Trucks

The sage words of Winston Churchill, "The farther backward you can look, the farther forward you are likely to see," add significance to the humble beginning of the trucking industry.

From the time the Frenchman Cugnot crashed his steam-powered artillery tractor in 1770 to the 1900's the world saw innovations by tinkerers, blacksmiths, mechanics, patent seekers, opportunists, visionaries as well as true craftsmen. Many unusual attempts were made to derive power and mobility to move heavy loads. Early travel with household goods by the uncounted numbers of pioneers moving to the West was made possible by the thousands of horsedrawn wagons that left their ruts in many stony passes.

Many craftsmen had, in the 1900's, transferred from the bicycle, carriage, and wagon shops to the horseless carriage shops to try to tame the fire-eating internal combustion engine. These men brought their skills with them; and many hybrid vehicles were developed both in size, shape, and power. Steam, electricity, natural gas, and even compressed air were tried with various degrees of success depending on the materials, metallurgy, skills, and available money to charm "lady luck."

The delivery or trucking industry started in the United States with the horse and wagon and converted to motorized buggy cars or small delivery vans. It did prove that with improvements these could be profitable and reliable.

The simple beginnings of some of the automotive truck "greats" is a chapter that is woven into the tough fabric of the transportation training.

Ford Motor Company

Henry Ford, a machinist's apprentice at age sixteen and an expert watch repairman at twenty, was still a teenager when he built his first steam engine. He worked for the Drydock Engine Works, the Westinghouse Company, the Eagle Iron Works, and the Detroit Electric Company, which became the Edison Illuminating Company. These varied experiences served to back up his genius so that when by 1893 the Duryeas publically unveiled their first auto, Henry Ford too had built a horseless carriage. His employer at the Electric Company offered to increase his salary from $125 a month to $150 per month if he would quit tinkering with gas engines at home and get some sleep.[24] Ford had a goal and in 1896 introduced a quadricycle. From 1899 to 1902 he was chief engineer for the Detroit Automobile Company. In 1901, with a two cylinder car of his design, he entered a ten mile race against the national track champion Alexander Winton. Before a crowd of 10,000 Ford won the historical duel by three-fourths of a mile. He then built the famous 999 and had Barney Oldfield drive it. The successes and track records led to the organization of the Ford Motor Company on June 16, 1903. With new assembly line techniques, the Ford Motor Company caused an upheaval in the staid manufacturing methods of the world with their production of the Model T. "As an auto or truck, no one liked the Model T. but the people."[25] History has the rest of the story.

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[24] R. F. Karolevitz, This Was Trucking (Seattle, Washington: Superior Publishing Co., 1966), pp. 110-113.

[25] *Ibid*.

Mack Company

Mack Brothers in 1900, after steam and electric vehicles, produced a gasoline operated sight-seeing bus that started them in the large vehicle and truck field. This was the famous Mack No. 1 used as a sightseeing bus in Brooklyn for eight years. It was then converted into a truck to serve until 1917.

The beginning of the Mack Company was with young John M. Mack who left school at the age of fourteen and became a teamster for a construction gang. Later he went to sea as a stationary engineer on a freighter; after that he went to work with a Brooklyn wagon builder. In the 1890's he and his brother Augustus bought a wagon builder's shop. Three other brothers joined in, and the family enterprise was underway. Before 1900 the firm was building bodies for horseless carriages, and John was experimenting with ideas for steam and electric vehicles. Mack Brothers Motor Company came into being, and in 1901 eight more buses and trucks were constructed. As its success grew its financial problems also grew; in 1911 the J. P. Morgan interests stepped in. Through mergers the new firm was named the International Motor Company. After many financial internal conflicts the company was again renamed the Mack Company. The development and production of the famous Mack Bulldog model A C from 1915 to 1939 set standards of reliability that spanned from World War I to World War II. Many a "doughboy" met the

Bulldog in World War I and went into business with it afterwards. Mack's war record gave it the momentum to enter into the field of fire engines, pumpers, and aerial towers.[26]

Dodge Motor Company

Dodge Motor Company was founded by two brothers who got their start in the transportation business manufacturing bicycles.

John and Horace Dodge, founders of the automobile manufacturing company in 1914, left their birthplace, Niles, Michigan, in 1899 to move to Windsor, Ontario, to manufacture bicycles under the name "Evans and Dodge."

> In 1901, the Dodge brothers, who with the help and encouragement of their father and grandfather became expert mechanics, moved to Detroit to become automobile parts makers. Producing axles, transmissions, steering gears and crankcases in increasing quantities, the company continued to expand rapidly.
>
> When the Dodge brothers decided to build an automobile bearing their own name in 1914, more than 22,000 firms applied for dealerships. On November 14 of that year, the first Dodge car was unveiled--a four-cylinder vehicle that weighed 2,200 pounds, was 6 feet 9 inches high and 13 feet long.
>
> The Dodge immediately earned a reputation for amazing ruggedness and dependability. It achieved such feats as climbing higher up San Francisco's Twin Peaks than any other car of its day. It was the first car to be driven to the bottom of the Grand Canyon and then up the

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[26] *Ibid.*

long ascent under its own power.[27]

Since 1914 more than 10 million Dodge cars and nearly 4 million Dodge trucks have been sold.

The White Motor Corporation

> The name "White" that has been recognized world-wide for over 100 years as a mark of leadership in machinery and equipment for industry and the consumer as well as equipment for transportation, construction, agriculture and industrial power dates back to 1866 when the White Manufacturing Company was organized in Cleveland, Ohio, by Thos. H. White, who at 28 moved his sewing machine business there.
>
> Business grew rapidly--during the next decade, and in 1876 the White Manufacturing Company was reorganized as the White Sewing Machine Company with Thomas H. White, President.
>
> By 1899, the year Rollin H. White, son of Thomas H. White, invented an automobile flash boiler, manufacturing facilities had been expanded and even bicycle production was averaging 10,000 vehicles a year.
>
> A year later or in 1900, the first White Steamer was built to establish White as a pioneer in the automotive field. The company's first truck was built that year and was followed two years later with the production of a five ton model.
>
> In 1905, the year before the White Company was organized as a separate company to handle the automotive line, White steamers were so well accepted, they were the only automobile permitted in the Roosevelt inaugural parade.
>
> History from 1906 on...the year The White Company (which grew into the White Motor Corporation) was organized as a separate company, production of White Steamers had grown to 1,500 units a year.

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[27] Dodge Public Relations Release, Chrysler Corporation, 1972.

> In the years that followed, White was the industry pioneer in developing trucks for many different vocations...and following the first World War...White reached a decision to discontinue completely the manufacture of passenger cars so all efforts could be concentrated on trucks.[28]

General Motors Truck Company

Max Grabowsky of Detroit in 1900 began building motorized trucks, two years later the Grabowsky Motor Vehicle Company was established. In 1904 the name was changed to Rapid Motor Vehicle Company after which it became part of the General Motors Truck Company which came into being in 1911. The company made both gasoline and electric models under the name of G.M.C. Truck. After several financial reorganizations as well as mergers, the General Motors Corporation emerged as the parent corporation in 1918 over Chevrolet, Buick, Oldsmobile, Cadillac, and G.M.C. Truck.[29]

Packard Motor Company

In 1884 James W. Packard graduated from Lehigh University with a degree in mechanical engineering. With his brother William, he established the Packard Electric Company in 1885. The cable manufacturing business was successful. In 1893 James had a car "on paper" and six years later a one cylinder, tiller controlled spindly runabout came into being. In 1903 the early name of New York and Ohio Automobile Company became the Packard Motor Co. The same year "Old

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[28] White Motor Co. Press Release.

[29] R. F. Karolevitz, This Was Trucking (Seattle, Washington: Superior Publishing Co., 1966).

Pacific" a one cylinder Packard was driven from San Francisco to New York, taking almost two months. By 1905 the firm was making trucks in Detroit. In 1912 a Packard Truck was the first to cross from New York to San Francisco with a three ton load all the way in six weeks. However, it was in 1921 that the last Packard truck was built and the passenger car was successfully produced until 1958, when the company closed down.[30]

International Harvester Company

A natural movement into the production of the automotive vehicle took place in February 1907 when the first IHC production vehicle was completed in Chicago. A period dating back to 1831 when experimentation with a machine to cut wheat was tried out by Cyrus McCormick. During the intervening period there was a concentration on the development of several types of farm machines: cutters, reapers, and binders. Through successful development and a need by farmers of the more efficient equipment the Company prospered. In October 1907 after about 100 Auto Buggies had been produced, the manufacturing of the Auto Buggies was transferred to the company's Akron, Ohio facility.[31]

Engines in the Auto Buggy and the Auto Wagon were 20 h.p. 4 cycle, 2 cylinder, horizontal-opposed air cooled cylinder type. In 1910 a four cylinder air cooled engine was developed.

Despite financial problems in the early 1900's and a U.S. Government antitrust suit, the company prospered reaching a value of $626,000,000 by 1929.[32]

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[30] R. F. Karolevitz, This Was Trucking (Seattle, Washington: Superior Publishing Co., 1966).

[31] Historical Facts About Early International Harvester, Automotive Vehicles, International Harvester Co., Chicago, IL.

The Truck Users

The story of the users of trucking equipment in the early days, the teaming companies, the haulers, the dray firms, and finally the truckers, is one that is just as interesting, important, innovative, and pioneering as that of the manufacturers. The training of truck mechanics grew out of need and financial conditions. The Wells-Fargo Railway Express, known today as R.E.A., was born of necessity. The need for moving merchandise and goods as well as early communications goes back to the Pony Express. The Wells-Fargo Railway Express was set up by the railroads to serve as a go-between for the customers and the railroads. For five dollars, plus the ten cent regular government postage, a half an ounce of mail could be delivered in San Francisco from New York all in ten days or less by way of the Pony Express from St. Joseph, Missouri on through hostile Indian country to San Francisco. It is hard to believe that the Pony Express was in operation only from April 3, 1860 to October 26, 1861, yet so captured the imagination of the country and world. The colorful and dashing riders, "WANTED- Young, skinny, wiry fellows not over 18. Must be expert riders, willing to risk death daily. Orphans preferred. Wages $25 a week..."[33] made it possible. The messages on wire or the telegraph that snaked its way cross country spelled the doom for the Pony Express and, in turn, has found its replacements.

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[32] H. Warp, A History of Man's Progress. (Pioneer Village, Minden, Nebraska), p. 351.

Railway Express, R.E.A. Express

March 4, 1839, a young man (William F. Harnden, 1813-1845) with an idea, a home-made carpet bag with bulges of packages from business men in Boston to business men in New York, and the use of steamer and rail, was in the act of starting his personalized express service. Before that, packages and parcels were being transported by anyone going that way.

Following Harnden's idea, railroads of that time added the then first Railway Express car behind the engine to "head up" the train. The idea was timely, business grew, competitors by the hundreds mushroomed. By careful growth, Harnden successfully added men such as Henry Wells and William Fargo, George Pomeroy, and others, who pushed the express lines into the wilderness beyond Chicago.

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[33] Pony Express-Rich in History, Inspirational in Courage, Public Relations and Advertising Division, REA Express, New York, N.Y., 1961.

Alvin Adams gave Harnden stiff competition between Boston and New York, then to Pittsburgh, Baltimore, Washington, and into the deep South. Their progress was the progress of the rickety rail trains of the day. A merger of many companies with Henry Wells as President, William Fargo American Express was the giant of the express business.[34]

The move to the West involving 2,000 miles to the gold country and service to the sprawling gold mining camps taxed the Wells Fargo Company Express; even more speed was needed.

The Pony Express on April 3, 1860, carried mail at $5.00/half ounce from New York to San Francisco in 7 days, 16 hours. The record stood and after 18 months became a part of history due to the telegraph lines that came into being. Actually, the Pony Express was a financial failure.

The Civil War Express Company did work for the North and South. The Adams Express created its Southern Express Company while Adams moved to the North.

First World War railroads were placed under government control. The seven express companies were ordered to combine into one under the name of American Railway Express Company.

In 1929 the leading railroads purchased the national express service and formed the Railway Express Agency.

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[34] Cavalcade of Express, Railway Express Agency, March 1956, Private Printing.

The Railway Express Agency has grown to 45,000 trained people, 13,500 vehicles, 14,000 offices serving 23,000 communities, and operates on 5,500 trains a day and 383,000 miles of rail, plus steamship and motor carriers. Of recent date there have been some modifications in their operations, with some railroads revising their participation.

The Arthur Dixon Transfer Company

The story of the Arthur Dixon Transfer Company is a family story that had its humble beginnings when a newcomer of Scottish-Irish descent, while running his recently set up small retail grocery, was obligated to take a horse and wagon in payment of a grocery debt. Circumstances created a need for moving merchandise, stock, and goods of the time in 1863. With vigilance, the hauling business became a larger enterprise and was concentrated upon. The Chicago Fire of 1871 aftermath demanded movement of goods and construction materials which added to the growth of the teaming business. Various innovations in sizes of wagons, number of horses used, material handling methods, distances to delivery destination, road improvement, and railroad development all had their effect on the continuing growth of this company.

The Columbian Exposition in Chicago in 1893 added to Chicago's growth momentum helping to temper the Depression of 1893-94 that had the country in a severe financial snarl. The growing railroad expansion to Chicago and then to the West made it the hub for transferring freight from the eastern railroads to the West, Northwest, and the South. The various railroads required freight houses, terminals, and trackage to and within the city limits. All this activity stimulated the need of transport vehicles for the construction as well as what followed, the continuous daily operations of transferring the inbound as well as outbound freight traffic along

> with the passenger movement. Anticipating the needs of the railroads and being ever ready with equipment to service their needs, The Arthur Dixon Transfer Company was a natural to meet the growing challenge of mountains of freight to be moved from freight house to freight house as well as inter-city traffic.[35]

During World War I and after, a switch into motorized equipment started, several Packard trucks along with some others such as Mack, G.M.C. Garford, White, and International were purchased. By upgrading key people and sending them for factory training, a nucleus of knowledgeable service people was created that proved the reliability and economy of the motor truck. However, the economics of the horsedrawn vehicle in short haul and the sentiment for good horses made it feasible to retain the horse in the short haul operations until the last horse was retired in 1934.

The Depression of 1928-33 financially tried many of the business houses. Many closed their doors because of lack of finances as well as business. In the teaming business this was a time of replacement of the horse and wagon with the greater load and longer distance hauling truck. A tremendous outlay of capital to continue against competition was necessary for the teaming companies of that time. Along with this was a need for skilled service people to service and repair the equipment that was put to its test each day. An informal on-the-job training was put into effect with men who showed potential in their driving or chauffeur jobs.

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[35] Arthur Dixon, In Memoriam - Privately Published.

A short while later an apprentice mechanic training program was instituted in shops during the '30's. This was continued on an informal basis as the need arose. In 1939 a formal agreement was arrived at with the Auto Mechanics Union to train and use apprentice truck mechanics in a ratio of one apprentice to four to five journeymen mechanics. A bit later related instruction was received by the truck apprentice for one evening a week at the old Washburne High School and later at the Manley High School. Over the years, the Truck Mechanic Apprentice Training Program furnished the Arthur Dixon Transfer Company with well over 90% of their trained service mechanics. The training program was a source of stable, well trained, and loyal employees that kept the equipment at reliable operating performance levels. This practical program exemplifies the necessary cooperation between the trucking industry, potential mechanics, unions, and public schools spoken of above.

The Century of Progress came into being in 1933 and served as a mainstay for many a business that almost foundered in the Depression. The Century of Progress literally pulled Chicago financially, culturally, and scientifically out of its swamp of provincialism and helped lay a financial foundation for its future growth. As a prime hauling contractor for the Century of Progress, the Arthur Dixon Transfer Company found itself with a very demanding task master with unusual requirements as well as around the clock use for its vehicles. Peak loadings, deadlines, monster overloads necessitated calling in additional outside facilities. Moving a baby submarine, supplying car and truck assembly parts to keep a General Motors assembly line operating within the Century of Progress Fairgrounds, fulfilling U.S. Customs entry and exit requirements, supplying all items for Piccard's Stratosphere Flight, provisioning exhibitors daily, supplying food and refreshment as well as removing shipments for customers were some of the many unusual hauling problems faced in the course of their operations. An army with logistic supply needs never had the variety and unprecedented problems to solve and conditions with which to contend. Without the beginnings of an apprentice training program Dixon Transfer Company would have been even more hard pressed to meet such demands.

The Willett Company

The Willett Company is also a story of a family whose founder, A. T. Willett, of Irish background, found a start in the extricated payment from his family's wholesale grocery that had closed. The payment consisted of eight wagons and twelve hungry horses. In 1868 Chicago was a growing tough boy with many challenges and problems to be resolved:

> The Chicago Fire of 1871, Chicago rebuilding ... "my kingdom for a horse and wagon, high prices -long hours!--bonanza days! But our town made it! Willett helped! Yes, and the money helped to put struggling Willett on its financial feet!"
>
> But horse trading was just one form of cheating. The average merchant then could give Maxwell Street traders of today a lesson. Sand in the sugar--four kinds of chickory and beans in the coffee--bootleg whiskey that flattened you with one drink, and labels that lied on ketchup and canned goods.
>
> Dirt came from wooden block streets, unpaved alleys with horses who helped with their generous droppings--coal or wood stoves. Dirt, flies, mosquitoes and more dirt were always in your hair and on your hands. Out driving, women wore two veils, a face veil under a big one which was heavy; men wore goggles and a duster. The answer to how kids lived through every kind of infection, disease, fever, colds, and sore throats that lasted all winter long, is that one out of every four died. Venereal disease sat next to you in school. There were only three drugs: castor oil, quinine, or whiskey straight or disguised as patent medicine.[36]

In 1894 many customers failed or folded up, and Willett was worried about the rent and the empty stalls.

> The brilliant Columbian Exposition carried Chicago into the clouds and carried us through 1893, the first year of the depression. In 1894--"after the ball was over" it sank abysmally--empty buildings--empty dreams--idle horses--idle tired men looking for jobs that were not there.

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[36] H.L. Willett, Willett and the March of Time (Chicago, Illinois: Private Publication, 1959).

Then a gradual return with the needed growth in Chicago land--

In the 20's, keen-minded business men had found in Research the answer to their continuous growth, a "Fountain of Youth" to keep their corporations young.

Forward looking cities caught the same spirit of progress--because aware that beauty was good business--that congestion and slums just had to go. A building boom in the late '20's!

The Depression--the business pestilence of 1931-32-33 was unbelievably virulent. Truthfully it was much easier to die than live--much easier than to face broken hopes, broken fortunes--broken futures.

For every millionaire who jumped there were one thousand who sat it out in dumb, tragic despair. One-family houses became two, then three-family houses. Bums took over the lower level of Wacker Drive. On the one-half mile stretch of wrecked buildings opposite our office on Desplaines Street the bums dug into the rubble just as in post-war Europe and made two and three man shacks.

Every Monday morning when I came to work there was a list of very worthwhile businessmen who said "the hell with it," closed their doors and liquidated their stocks at one-tenth of their value.

The second Revolution from horses to trucks was well under way. On much better roads the heavy truck was finding a place for itself. We had gotten over our "mad" at them for knocking out our beloved horses.

The third big Revolution which obsoleted horses and the heavy truck as well was on the way. The light pneumatic-tire truck to which was added aluminim bodies in 1930, the first in Chicago, was the Third Revolution.

1946-60

We have stepped up our experiments in Education! Make a profession out of your job! Driver trainers,...weekly safety movies... dinners...teaching our men specifically how to

> avoid 'rat hole expense accidents'...foremen's schools...yearly safety prizes...Truck Roadeos to test driving skills.
>
> The next change was the substitution of trailers for the heavy duty trucks. This released the tractor power plant to go about other work while the trailer would be unloaded and then reloaded.[37]

Early Attempts at Training

Post World War I Period

The period after World War I was a hectic period of adjustment of the economy back to civilian production. The economy was strongly affected by the expansion of the various new techniques in industry that were developed in the production of war material. Along with the hard impact of government surplus materials and equipment on sales of newly manufactured truck equipment there arose a tight money situation in 1919 and 1920. As a result there were many failures of the small economically vulnerable truck builders. The larger companies also adjusted their operations in order that they could survive the lean market conditions.[38] Mechanic apprentice programs would have been considered an impossible luxury in this context.

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[37] *Ibid*.

[38] *Ibid*.

The involvement of the returning "doughboys" in the world of work was a prolonged period of adjustment and readjustment. Training programs in the public high schools were being organized under the appropriated funds made available under the Smith Hughes Act of 1917 that permitted elective vocational training. There was a time lag in getting the items to be taught as well as in how to apply the funds properly to meet the needs of the students and industry:

> During the year following World War I, a combination of events occurred which led to an increase in the number and severity of industrial disputes. Following a brief downswing in business immediately after the war, there was a quick revival, accompanied by rising prices. By mid-1919, labor was faced with the mounting cost of living. Real wages lagged. At the same time, withdrawal of the Government's limited protection of labor's right to organize and the termination of wartime governmental labor agencies removed restraints which had kept industrial relations running more or less smoothly during the war years. As a result, numerous employers refused to recognize labor unions which had been organized in their plants. So to protect their recently won gains, and to combat the victories of anti-union employers, many labor leaders called for more aggressive action.[39]

Early Truck Mechanic Training

Early training programs for the service of truck equipment were mostly of a basic "on-the-job training program" with personal factory training of a few weeks duration. When new vehicles were purchased, the factory made available to the owner or his service mechanic for a period of one week to two months, the opportunity to work in the plant and learn the peculiarities of proper servicing and repair. A bit later, with field modifications and corrections being necessary, bulletins and shop manuals came into being. Periodic factory seminars also were instituted. The actual field experiences the U.S. Army had in the Mexican campaign of 1916 were a prelude to World War I.[40] These problems of supply, performance, and repair became realistic exercises in service training that prepared many a man for truck maintenance.

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[39] U.S. Dept. of Labor, Bulletin 1000: History of the American Labor Movement (Washington, D.C.; Supt. of Documents), p.25.

World War I continued to train many future mechanics and truck transport operators. Many small private trade schools based primarily on machine shop training blossomed and died due to the economic unrest that followed World War I. The Smith-Hughes Act of 1917 put government funds into public school training programs in the practical arts and remained the mainstay of training for many decades. It later expanded into related areas and paved the way for additional Congressional Acts and appropriations.

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[40] *Ibid.*

Apprentice Training Program Solves Skilled Manpower Shortage

Prior to World War II the writer was the Shop Foreman in the Garage of the Arthur Dixon Transfer Company. There were about 175 trucks and tractors and 400 trailers to be maintained. Much of the equipment was "seasoned" due to the ravages of the depression, tight money, overloading, as well as overuse on some schedules.

The writer had difficulty getting well trained, reliable mechanics. Manpower turnover was expensive. Many newly hired people had to be released due to misrepresentation of abilities, poor workmanship, and unreliability.

Permission to start an apprentice truck mechanic training program was obtained. It was set up as a full four year schedule consisting of related classroom training on automotive theory in a public high school and on-the-job training with progressively more complex job assignments under the guidance of experienced mechanics. The program was registered with the U.S. Department of Labor, Bureau of Apprenticeship so that an official U.S. Department of Labor certificate and diploma could be awarded upon completion. The program met with the approval of the Mechanics' Union.

Candidates were carefully selected by thorough interviews, math, micrometer reading, and measuring tests, as well as reference and school achievement checking. Then in a 30 day probation period, supervisors carefully rated their progress in skill as well as knowledge development.

Their ability to cooperate and get along with their shop mates was also scored. Ability to act in emergency situations, cope with shop pressures, meet time schedules, and exhibit initiative and alternate solutions to problems also counted in the total score.

As automotive equipment became more and more complex, refresher programs were instituted for journeymen mechanics. In many instances the supplier of repair materials or the truck manufacturer sent in a field man to show the proper methods of usage, adjustment, or repair. On occasion, factory training programs or clinics were also attended by the apprentices.

The truck mechanic apprentice program kept the company provided with able, reliable mechanics through the years. The shop was self-sufficient in that it could handle any shop problem of equipment maintenance. This included any major overhaul of engine or trailer, body work, electrical repairs, modification, or reconstruction.

Dollarwise it could be said that the company had equipment continuously available at reasonable operating rates.

Selection Standards

In the application of training to the individual, selection and testing were mainly on an individual demand basis. Attempts were made to help screen with early psychological tests; however, success was distant in these early experiments. The effects of the economy on the labor market caused more training "wants" in the higher paying fields whether the individuals were capable or not; and, as a result by natural attrition, those with the capabilities survived the cyclic business ups and downs. The cost in man hours in these trial and error attempts to gain skills and livelihood was unrealistic. Even to this day, we still are seeking to place square pegs in round holes at astronomic losses in man hours and losses in equipment maintenance.

Formalized Training Programs

Factory Schools

Upgrading service mechanics with periodical training within factory facilities has proven very effective. A close contact with service needs and problems had helped set up courses to solve the most troublesome areas. However, these courses were often for the seasoned mechanic and not for beginners.

Cost studies often showed that good training helped keep operating costs down. Repeat sales gave the manufacturers an incentive to assist in training. Specific short courses were set up and brought to the large truck shops or to area seminars which were often sponsored by the local dealer. From this developed the area technical centers of manufacturers. Needed subjects were taught to the service mechanic, and programs were set up for apprentices in specific areas needed by dealers. These short courses were often very narrow and required follow-up by several courses to round out the skills, knowledge, and abilities of apprentices.

Presently the emphasis is on the upgrading of all service people. The legal requirements of exhaust emissions control, noise control levels, and the heavy equipment electronic brake control make it almost mandatory for mechanics to receive training in these areas.

Voluntary mechanic certification testing is also stimulating the average mechanic to upgrade his training. The factory training center has been meeting some of the advanced demands. The basic training so needed by the apprentice, however, is being left to public schools or on-the-job training.

Public Schools, Related Supplementary Training

Training in related theory was called for in many of the formal apprentice mechanic programs. This supplementary training in the high schools usually amounted to about 120 hours per year. It was difficult to get a program in the high school that only amounted to about three hours per week. It was achieved only through the joint action of several companies which requested the operation and supplied apprentices for these programs. An example of this has been in Chicago. A program involving apprentices from the United States Post Office and several of the large trucking companies used the old Washburne School and then moved to Manley Trade School facilities. After two moves the program finally became part of the Washburne Trade School in its larger and newer facility. Presently programs are on a subject basis without a full formal requirement.

Private Trade or Technical Schools

Private trade or technical schools are an investment in buildings, physical equipment, technical skills, and public good will. As such, investors seek an adequate return on their equity. No matter how piously dedicated, the realization of profit is a primary motive for the existence of any privately financed school. There is also a price tag on any endeavor, be it public or private, even though obscured and hidden. The costs of fully educating a student in the public schools are often presented in part. Total costs must include the building capital investment--so often overlooked in figuring public education costs. Sometimes private vocational technical schools are viewed as preying upon some of the unsuspecting who lack a "buyer must beware" skepticism of the business world. The serious gap in public school career education in failing to meet youth's as well as industry's needs has created this void which the private vocational technical schools fill. In some of these schools, shoddy operations have given private schools as a whole a black eye and tarnished the educational halo they assume.

However, industrial demand for the practical vocational-technical education with skills and abilities is continuing. This education best meets the needs of industry without upsetting their production facilities. The preparation and training in knowledge, skills, and abilities must be given to the newcomers, be they high school graduates, college drop-outs, or persons with obsolete skills.

In the present white collar, college preparatory movement, it is found that of each high school graduating class only about 20% will graduate with college degrees (national average). The 80% who do not graduate college are the large group from which some frustrated angry young people come to the labor market without marketable skills. The need of vocational schools for training and preparing young people and upgrading skills of those already in industry is very apparent in unemployment statistics.

Unfortunately, in the public school area, the academician's heavy hand is on the throttle controlling the vocational training pace. Consequently, the private technical schools fill in the void with an approval from industry to furnish them with trained people at no expense to them since the student pays his own way. They seek graduates needing a minimum of training for their needs. The young person between 18 and 24 years of age must make fast progress in these most important years, before his family responsibilities overwhelm him. The finding of the occupation for which he is best suited, enjoys the most, and can physically meet is one of the most important decisions of his lifetime. His mental and spiritual well-being is dependent on this best choice. The private technical school with its concentrated and accelerated courses can help in this decision.

Much criticism has been aimed at vocational education because some programs offer outmoded curricula taught on obsolete equipment by teachers who are out of touch with the occupations involved. It behooves every vocational educator to help obviate this criticism by making sure that his curriculum is relevant, his laboratory properly equipped, and that he himself is up to date in his occupational field.[41]

Vocational education cannot withstand the educational lag sometimes found in other curricula. It not only must be up to date; it must anticipate the future. The purpose of vocational education is to prepare youth and adults for entrance into an occupation and to upgrade and retrain employed workers. When it fails in this objective, it fails the youth and the adults it claims to serve, thus decreasing its mission in the total education program.[42]

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[41] American Vocational Journal, March, 1969, p.10.

[42] Ibid.

By being closer to industry, its needs, demands, and also closer to its new developments, the private technical-trade school should be in a more advantageous position to bring forth programs that will meet the needs of the technical student in its curriculum. This also means an obligation on the part of the technical school to be close to the employment needs of industry.

III. CONTEMPORARY SOLUTIONS

The Need for Craftsmen

SENA (National Apprenticeship Service of Colombia)

Apprenticeship and On-the-Job Training

The Role of the Service Department

Survey Questionnaire

III. CONTEMPORARY SOLUTIONS

The Need for Craftsmen

> "Craftsmen are made, not born." Under today's circumstances, with technological demands of modern industry calling for more and more skilled workers, it is up to industry itself to provide craftsmen necessary for the future. If it does not meet this challenge, industry is inviting serious trouble. Less efficient workmen spell lower productivity and higher costs.
>
> For years there were many who regarded a widespread system of education, based on "liberal" education was construed to mean collecting the wisdom of the ages and equipping young men to live rather than to work.
>
> In the world of today, however, it has been recognized that an adequate system must include equipping young men to work with their hands as well as their heads through sound, comprehensive apprenticeship training programs in all the recognized crafts.[43]

A criticism of the above quotation is that Industry already has had the opportunity and has been found to be conservative in the training of its needed manpower. The competitive requirements of the market place require a close scrutiny of all expenditures that cause any fractional increase of cost in the end product or service that must compete. This applied rugged individualism is survival of the fittest and as such is not a place for nurturing the newcomer no matter how willing and gifted in aptitudes. The apprentice is an investment in the future rather than the present, to which he is a liability. Even the most far-sighted industry finds itself at a disadvantage when adding to its product the cost of training an apprentice while a competitor may not have that cost to consider. An immediate return is sought to make the training less expensive resulting in shortening of the training period and sometimes short-cutting additional skills that should be learned.

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[43] Commonwealth of Massachusetts, Division of Apprentice Training, Dept. of Labor and Industries, The Student Appraises Apprentice Training.

Unless standards and ethics for training are established that will fall equally on all competitors, only the most deeply-rooted and financially sound companies will be able to invest in the future return that can be realized from a comprehensive apprentice training program.

Today's technology is expanding into more and more electronics, computerization, and sophisticated devices that prohibit training on the job without pre-training on more basic equipment. The inability of industry to do this pre-training adds to the washout rate of people brought into industry's short courses.

A coordinated basic training is needed, with industry making its needs known, and helping to direct as well as set realistic goals which fit into the total curriculum of our public school system. This would allow a graduating student to have a set of skills enabling him to enter industry with a minimum of cost to industry for his apprenticeship.

This participation and direction on the part of industry would allow the public school system to operate in a realistic atmosphere with motivation from goals defined and attainable without the pitfalls of business cycles upsetting terms of training and frustrating participants.

The comparison made to the young man in European countries starting his apprenticeship earlier than his American counterpart is very important and requires that our industries contact the young man earlier to stop the draining away of potential apprentices. Naturally, they are discouraged by the longer training period because of their need for a salary higher than that ordinarily available to the starting apprentice. The short term training in U.S. industries provides for assembly line work at most; the fairly high return realized by the participant tends to attract the high school graduate whose inclinations are in that area. However, the skills to maintain, repair, and modify equipment are not developed there. The boredom of assembly line work does force workers into a state of frustration and absenteeism. Working conditions are an issue because of the sensitivity of the human being to repetitive, non-challenging work as found in high-paying assembly line operations. All the large automobile manufacturers are considering and changing ways to make assembly line jobs more palatable.[44] In Sweden, entire cars are being built by teams. A new plant built by Volvo is set up so that one worker team can put together large sections of a car from beginning to end. Production is slow; however, it meets the boredom problem with some success. New innovative methods are necessary so that de-humanizing operations can be left for machines while the challenging operations are left to motivate and satisfy the urge for accomplishment.

SENA (National Apprenticeship Service of Colombia)

A very interesting and successful training program has been underway for almost 20 years in Colombia, South America. Colombia has a population approximately one tenth that of the United States. Problems of unused and under-used human resources, literacy, and employment have added to the training burden. SENA has successfully taken school dropouts and made them into qualified workers for semiskilled and skilled jobs with a percentage going on into supervisory and management areas.

The success of the program that is financed by a two percent payroll contribution where 10 or more are employed was sparked by Dr. R. Martinez. While attending Colombia's

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[44] Michael Mauney, "Boredom On the Assembly Line," Life Magazine, Sept. 1, 1972, p. 38.

National University, Dr. Martinez became concerned with the human loss involved in people without skills who also lacked the opportunity to gain skills. This lack of manpower to develop Colombia's resources brought forth from Dr. Martinez, at 25, the idea of creating a national system of free vocational training for undereducated youths and adults. He proposed this program in his formal university thesis. His post-college years were devoted to "selling" the idea to anyone who would listen. His confidence that his goal was right and his contacts to industry, labor leaders, and government officials fired up the program. In June, 1957, SENA was established by government decree as a national system. Dr. Martinez was named National Director of SENA.

The following additional material has been excerpted from Colombia Today, a newsletter published by the Colombia Information Service:

> NATIONAL APPRENTICESHIP SERVICE (SENA)
>
> SENA is the most important training institution in Colombia outside the formal educational system. It will soon complete 20 years of successful operation. It is an autonomous public unit of the Labor Ministry, but has an independent source of revenues--derived from a 2 per cent compulsory tax imposed on the payrolls of all enterprises. Originally, its programs were only concerned with the training of those already employed. But more recently, SENA has been strengthened to devote at least 10 percent of its revenues to the training of the unemployed. The range of its programs has also[45]

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[45] Colombia Today. (Colombia Information Service, 1974), Vol. IX, No. 6, p. 3.

been increased to cover not only the training of blue collar workers and clerks, but also managerial personnel and entrepreneurs. Another special program has recently been instituted by SENA to service small and medium-size enterprises as well as large concerns.

Due to the compulsory nature of the contributions received by SENA, its services cover various other economic sectors, including agriculture, manufacturing, trade and hotels and tourist services. Therefore, the program devoted to the small and medium-size enterprises is not restricted to manufacturing.

One of the most important functions of SENA relates to the training of young people between 14 and 21 years of age. Such training or apprenticeship ranges between two and three years and alternates teaching periods of six months at the SENA schools and shops, with six months on-the-job training. By law, all enterprises employing more than 20 persons are obligated to hire SENA apprentices, but they are not permitted to employ more than 5 per cent of their total number of workers from this institution.

The technical assistance offered by SENA to small and medium enterprises is largely supported with international technology: The United Nations Development Program, the International Labor Organization, the Industrial Training Service of the United Kingdom, the Canadian International Development Agency, are among the suppliers of technical assistance.

In the case of small and medium enterprises, SENA assistance covers the following aspects: industrial relations, accounting and finance, production, marketing, purchasing.

The program also offers assistance relating to credit facilities. Some areas covered are: information about various sources of credit; evaluation and study of credit requirements; preparation of feasibility studies; assistance in credit application and follow-up on the project to be financed, until its completion.[46]

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[46] Ibid., p. 4.

SENA, an acronym for the Spanish word "dream," has fired up the imagination of the hard-headed realists in management, labor and government to form a practical and viable education program--one that is expanding the skills, knowledge and ability of the people of Colombia. Research into the practicality of applying some of its phases to the United States apprenticeship programs should be done. Certainly, some of the Colombian ideas could help our lagging apprenticeship training.

Apprenticeship and On-the-Job Training

Sources of instruction, practical training, and real work experiences, through apprenticeship and on-the-job training for students entering employment on graduation from high school are many and varied. All are seemingly dependent on the attitude of self-help within the industry itself. Lack of a general desire to raise the abilities of its own technicians leads industry to the serious shortages we have witnessed in some of our fast growing and complex service industries. The automotive truck industry is a good example. Mass production made possible by standardization of engineering, parts, processes, and assembly techniques falls short in truck service where variables in repair procedures and complexity of operations meet head on with skills and abilities inadequately trained to give the maximum performance and economy designed into the commercial vehicle.

Successful, serious attempts have been made by segments of the automotive industry, by the U.S. Department of Labor, Bureau of Apprenticeship, as well as by the Auto Mechanics Union to develop a source of reliable well-trained manpower to service the complex high performance equipment of today.

A successful Truck Mechanic Apprentice Training Program demands high standards of present capability and potential in the apprentice. Our present high school trainee literally finds himself being asked for twenty years of experience at eighteen years of age. His ability now and a continuing growth in this ability is expected so that at the end of the four-year truck mechanic training program he will be a well-experienced technician measuring up to the journeyman title he will receive on graduation.

The needs for trained manpower in the trucking industry today have been increasing. Forecasts from previous years have been unheeded and coupled with a general lack of concerted effort on the part of the industry to help supply its manpower needs. Thus we see a continuing decrease in the supply of trained men for the trucking industry alone which, at present, finds itself short by 250,000 trained mechanics.[47]

A realistic cost evaluation of the results of not having these 250,000 trained mechanics available to economically and properly service and maintain safety of operation, would show an excessive loss of lives and property. Sufficient and properly trained apprentice mechanics should be the objective of this automotive and truck industry training program.

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[47] U.S. Department of Labor, Manpower Administration, Apprenticeship and Economic Change, Technical Report No. 3, 1964, p.3.

Getting into the beginning phase of an automotive and truck apprentice mechanic training program, we find divisions exist which include the following:

Dealership apprentice mechanic programs are lightweight with seasonal problems of feast or famine with regard to repair work movement. A certain reluctance exists on the dealer's part to start a man on a four-year program of apprentice mechanic training. To justify holding the trainee in periods of low shop volume is difficult; it is almost better to have a journeyman mechanic (perhaps one pirated from another dealer at an extra premium above union scale) who can cover all phases of shop work adequately.

A high school student interested in following the apprentice mechanic route in an auto dealership may find it best to try a large auto/truck dealer where a year round volume of work will provide a wide variety of experience as well as a certain amount of security and pay increases every six months. The likelihood of being able to stay in the apprentice mechanic program for the four years without a layoff is most probable in a shop of this type.

In contrast we find the large trucking fleets with developed apprentice truck mechanic training programs.

These usually are brought about by the coordinated efforts of enlightened trucking company management, the U.S. Department of Labor, Apprentice Bureau, and the Auto Mechanics Union. Standards of work learning have been set up for the four-year training program with each phase and period laid out with the stipulation that a maximum of six months will be spent in any given type of work--thus insuring full exposure to the many varieties of skills needed by the auto mechanic. This trucking industry program is flexible to meet the specific needs which, as in every other industry, include seasonal problems and cycles of repair work. Where specified and needed, related instruction is set up at a public high school (Westinghouse in Chicago is one of the newest which is equipped and seeking trainees) for one three-hour period a week, or as needed by apprentice programs. A rotational program of exposing the apprentice to all types of shop work is followed so that a continuing challenge is achieved with an inquisitiveness that carries over and encourages senior shop men also to be in the know on new developments. Thus, a benefit to the program and the company is realized in the upgrading of senior men indirectly through the truck mechanic apprentice's presence.

The truck mechanic apprentice can take related instructions in automotive training through courses ranging from short six-week courses (such as those at some Chicago private trade and technical schools) to a comprehensive five hours per day - five days per week - one year course.

On-the-job training in the truck service industry requires some basic know-how--either by vocational auto mechanics from high school or from technical schools. In general, the young man is brought into the truck shop and assigned to a senior man to serve as his assistant or helper. He may also be shifted around to other truck service departments to gain additional skills or may be assigned to one area for a period of time. This very informal approach may be used in small shops without any formal program layout. However, from the standpoint of the young man this can be a blind alley if he is assigned, for example, to a continuous job on tires, grease rack or parts room.

Additional training of the truck mechanic apprentice can be had through home study or correspondence courses available, for example, through several schools in the Chicago area. One home study course offers a concentrated two-week resident training to the student upon completion of his Automotive Home Study Course.

The advantages of correspondence or home study courses are that they meet the student's available time and can be accelerated or drawn out depending on the student's limitations and his ability to discipline himself and concentrate on his studies. A good communication between the student and his correspondence school are important for the greatest benefit to the student.

A just criticism of the present truck mechanic apprentice training program is the lack of wholehearted participation on the part of the automotive-truck industry --a general lack of looking ahead and rather seeking only immediate relief. The U.S. Department of Labor Bureau of Apprenticeship has, for a number of years, attempted to serve as a catalyst for the automotive-truck industry to establish programs in spite of a general reluctance on the part of that industry to accept help. The Auto Mechanics Unions and the automotive dealerships have had mediocre programs that have not even come close to meeting the needs and demands with enough well-trained men. Limited time programs do not result in well-rounded mechanics:

> "Apprenticeship is the Development of the Combined Skills of the Mind and the Hands."[48]

One of the main problems in the development of apprenticeship training is the strong influence of the business cycle. Industry finds itself seeking apprentices and trained mechanics to fill its needs when business is booming. Unions help develope apprentice programs and want to add trained men to their rolls.

When business is on the downgrade industry seeks ways of cutting its payroll and costs--usually the apprenticeship program is at a minimum. The unions seek to protect their members and tend to discourage apprenticeships as competitive to journeymen.

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[48] Commonwealth of Massachusetts, Division of Apprentice Training, Dept. of Labor and Industries, The Student Appraises Apprentice Training, June, 1956, p.3.

In the Appendix a series of graphs extracted from Apprenticeship and Economic Change[49] illustrate well the problem of lack of enrollment of new apprentices when unemployment is high (figure 1). Completion rates of new apprentice registrants and indices of unemployment are shown in figure 3. In figure 4 indices of unemployment and new apprentice registrants is shown with completion rates of apprentices.

Standards of Apprenticeship as registered with the Bureau of Apprenticeship are shown in the Appendix followed by a copy of the REA Express Automotive Mechanics Apprentice Program Chassis and Body Apprentice Indenture.

The Role of the Service Department

After World War II, the role of the service department as an earnings provider in the automotive field was gradually assumed by the highly vocal sales department. The service department was relegated to the expense of operation and as such became a subject of overzealous efficiency surveys and cuts. The first casualty was any non-productive long term training program such as mechanic apprentice training. The motto of "We service what we sell" soon was discarded. Reliability of operation on automobiles diminished and made possible the inroads of the simpler, compact, and economical, foreign cars. This has resulted in a tremendous effort of automobile factories to set up guarantees and warranties to attract the customer back to their service centers. However, this in turn has thrown the burden of supplying skilled manpower onto the factories. Short term training courses, creation of specialists, continuing need of retraining, as well as upgrading of knowledge and skills has set the training of skilled automotive and truck mechanics into a tightening spiral. The demand of the government and the consumer for mechanic skill certification has been met by a half-hearted volunteer certification and testing program that was started in November of 1972. This testing program is in four parts covering the following:

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[49] U.S. Dept. of Labor, Manpower Administration, Bureau of Apprenticeships and Training Technical Report No. 3, 1964 pp. 5, 8, 11, 13.

1) Engines and their fuel induction, ignition and exhaust systems.
2) Transmissions, clutches, drive lines, and axles.
3) Suspension, steering, and brake systems.
4) Starting and charging systems and basic electrical and air conditioning systems.

Leave Room for Learning

Unfortunately there exists a belief that by "doing", learning will take place. "Hands on" sounds great but these procedures often disguise and involve busy work, tinkering, taking apart without reason.

Real learning can only take place when an understanding of materials, function of parts or equipment is related to some prior understanding or related activity.

A parallel between the automobile student and a medical student can be drawn. First is the need for knowledge, second--role experience, and third, the application of the knowledge and experience. It would be a travesty to release interns and allow them in operating rooms to explore and then diagnose by hunt and seek procedures real or imaginary ills. The counterpart mechanic intern needs knowledge, role experiences, and finally experience in diagnosis with actual work as the final requirement.

The use of school shops as an area to place students having difficulties in other areas--"if they can't work with their heads they can work with their hands," "let him find himself in the shop," is often the rule. This philosophy tends to make constructive teaching a remote possibility until the problem student either leaves or accidentally finds his percentage of success in the shop area. This method is a waste of student man hours, and taxpayer's funds. Instead, efforts should be directed to improve psychological testing; and the student should be directed into the areas of greatest possible success in order to motivate him away from his psychological problems and to correct these problems. Psychological testing and guidance of the student into his area of greatest possible success should take the place of whims, visions of grandeur, likes without foundation, or parental directives. Consideration of aptitudes, physical abilities, skill indications, mental abilities, and desires of a serious nature, combined with the psychological profile of the student will raise the success percentage greatly.

In industry what a person knows is still a certificate of merit. Expertise is drawn upon for solution of the difficult; the easy is left to the strong back. The spring, muffler, and tail pipe man is the doer. The knowledgeable diagnostician is the expert drawing on his knowledge to solve the doer's problems. Leave room for learning, not only doing and hands on, but the knowledge as to what, why, how and when to complete the circle of knowledge about their applications.[50]

After learning comes understanding and belief in ability and decisions. The following personal beliefs and a series of questions concerning them were submitted to the Automotive Transportation Supervisors' Association of

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[50] K. F. Perry, "Look Ma! No Heads!," School Shop, Prakken Publications, Ann Arbor, Michigan, March 1970, p. 66.

Chicago, a group of experts that is involved in directing the maintenance of truck and automotive equipment on almost 100,000 units.

We have come to a point at which we must re-examine the truck mechanic apprentice training program. I believe that:

A. The trucking industry is not realizing the potential of truck mechanic apprentice training. A four-year training period is necessary to complete the program.

B. A greater stability in shop personnel can be realized through better performance, knowledge, loyalty, and dependability. A condition of stability in the training.program is needed even in an unstable economy in order to bring about continuity in the program.

C. Interest, attitude, ability, and quality of work are still attributes sought in apprentices. Better testing and screening of apprenticeship candidates are needed.

D. Improved public relations are needed with a cleanup of shops and an improvement of working conditions for the apprentice.

E. Greater involvement by truck equipment manufacturers in the training of truck mechanic apprentices can lead to "lower cost per mile" with mutual benefit to the owner, manufacturer and apprentice.

Questions and results are listed and graphed in the following pages.

Survey Questionnaire

The following questions were presented to the Automotive Transportation Supervisors' Association at its regular meeting on March 11, 1971. All A.T.S.A. members not present were contacted by mail. The results were summarized and put into graph form. The questions and answers are discussed and graphed. Questions #3 and #4 are omitted from graphing since they are rather personal questions asked of the person and not pertinent to the questionnaire.

The complete survey questionnaire as submitted to the A.T.S.A. membership will be found in the Appendix.

Questionnaire Results

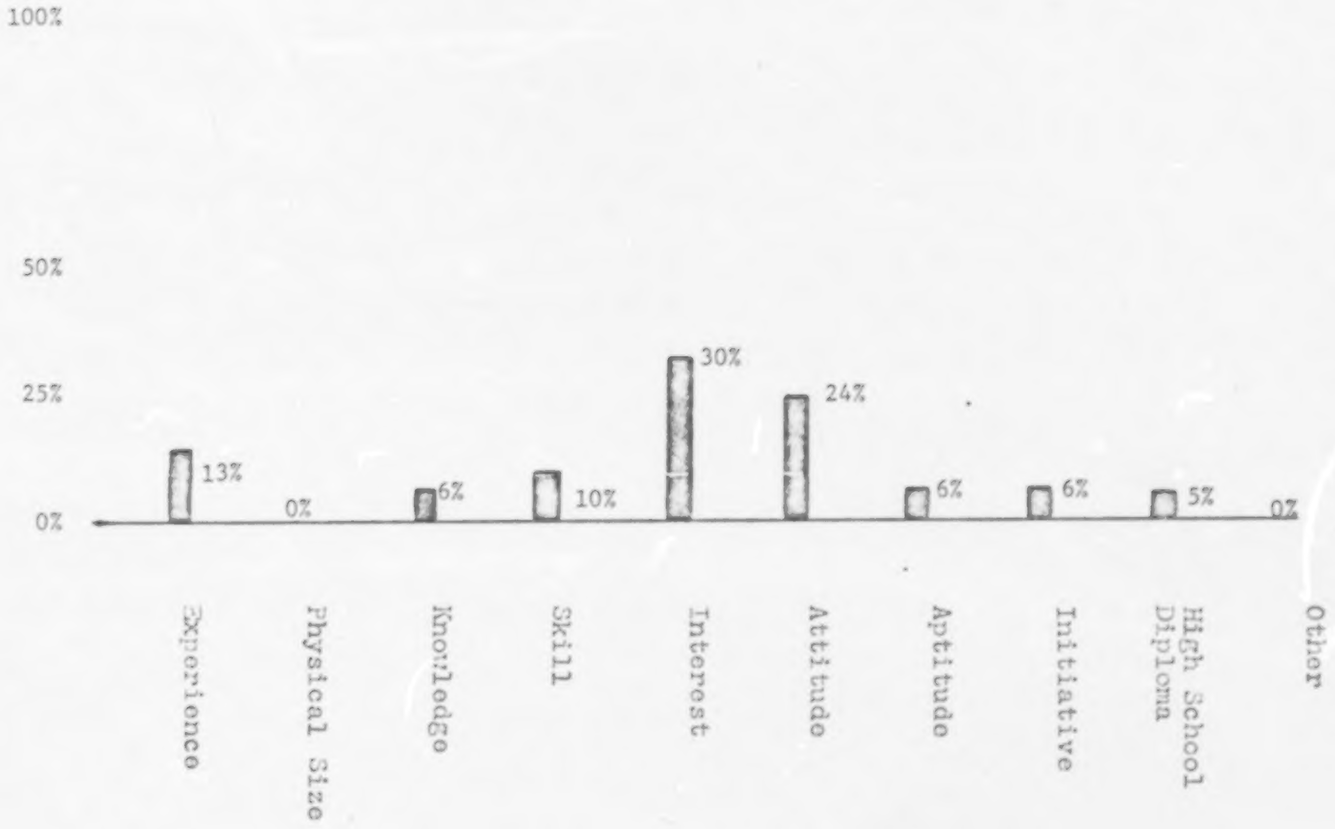
Question 1: What do you look for when hiring a prospective Truck Mechanic Apprentice?

Of the total answers 30% rated Interest highest, Attitude rated 24% with Experience 13%, Skill 10%, Aptitude, Knowledge, and Initiative each at 6%. The High School Diploma drew 5% while Physical Size had 0% required.

This would indicate that Interest and Attitude are rated most important with Experience as third most important.

Questionnaire Results:

Question 1.
What do you look for when hiring a prospective Truck Mechanic Apprentice?



Questionnaire Results

Question #2: What qualities or characteristics do you expect in an Apprentice Truck Mechanic?

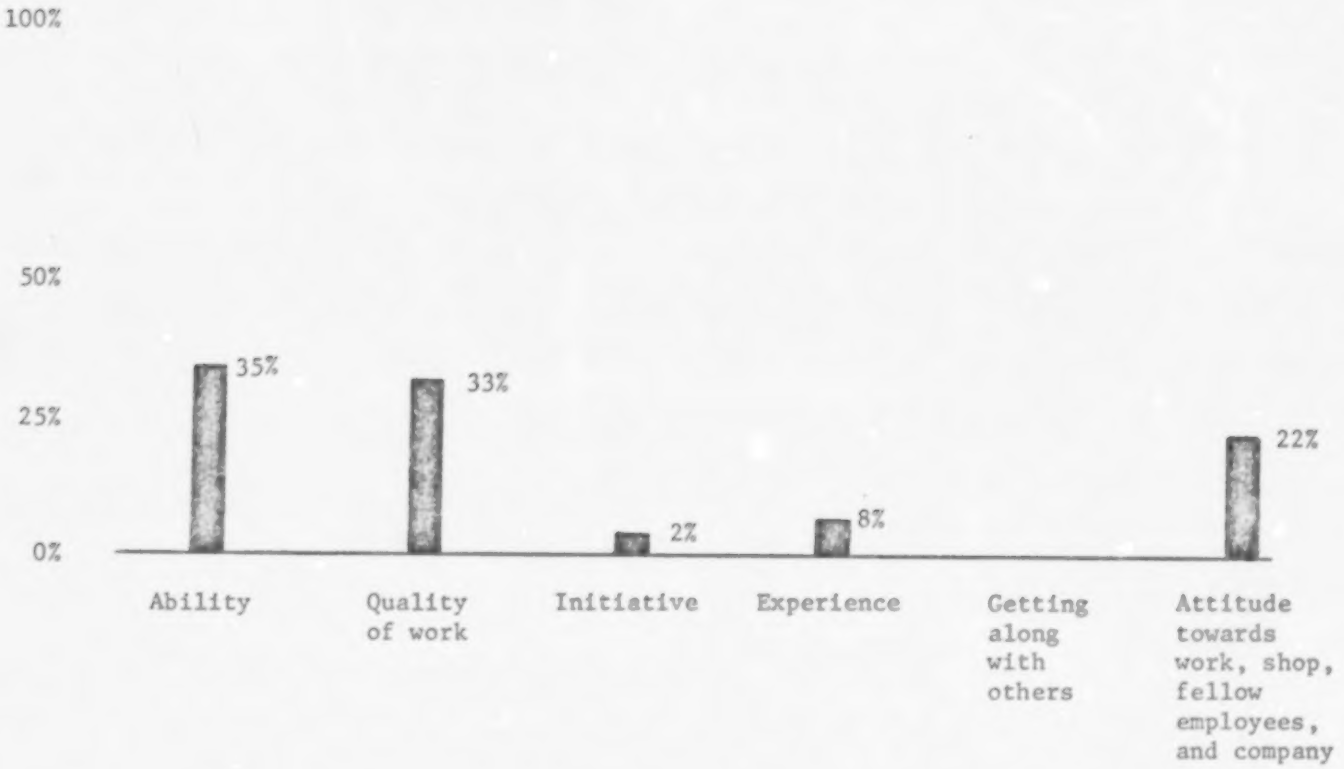
Ability was rated by 35% as most important. Quality of work was rated by 33%. Attitude towards work, shop, fellow employees and company was rated at 22%. Experience at 8% and Initiative was rated at 2%.

The high rating of Ability, Quality of Work, and Attitude show the importance attached to these characteristics by the people in the industry.

Questions #3 and #4 results are omitted due to their personal nature which is not pertinent to the questionnaire.

Questionnaire Results:

Question 2.
What characteristics do you expect in a Truck Mechanic?



Questionnaire Results

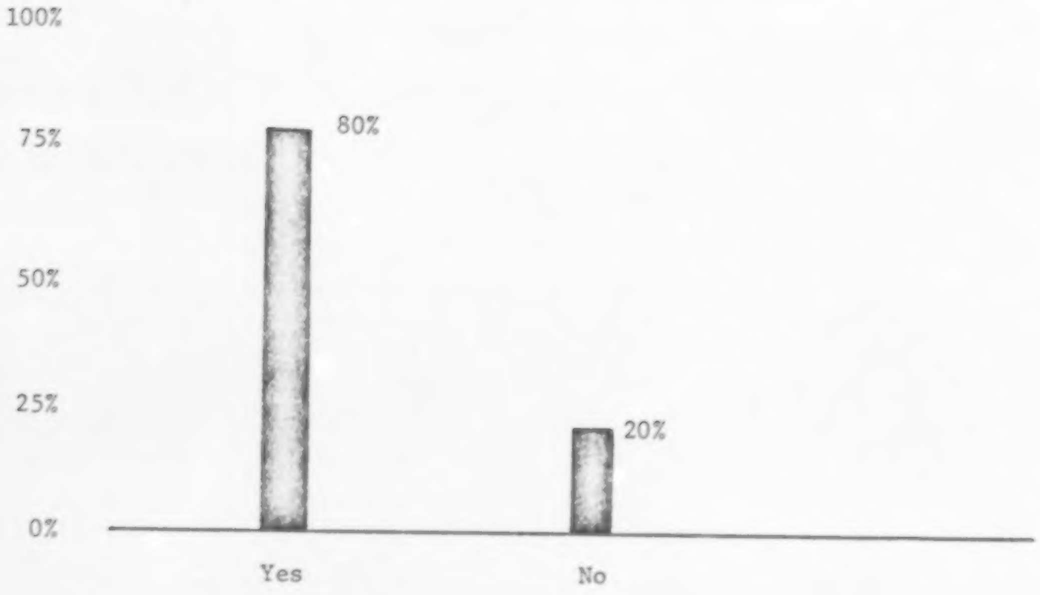
Question #5: Do you feel that better testing and screening is needed to help select career-minded Apprentice Truck Mechanics?

The 80% graph maximum shows the great need of better testing and screening to help select career-minded Truck Apprentice Mechanics. The practical experts' opinions recognize the shortcomings of the present informal selection and screening of career candidates. The poor performance of the past needs correction.

Questionnaire Results:

Question 5.

Do you feel that better testing and screening is needed to help select career minded Truck Mechanic Apprentices?



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Questionnaire Results

Question #6: Where do you start an Apprentice Truck Mechanic in the shop?

The highest ranking, 59%, was received by starting the Apprentice as an assistant or helper to a mechanic. This gave direct experience to the Apprentice, work done was accountable, and a direct role and participation by the Apprentice was realized.

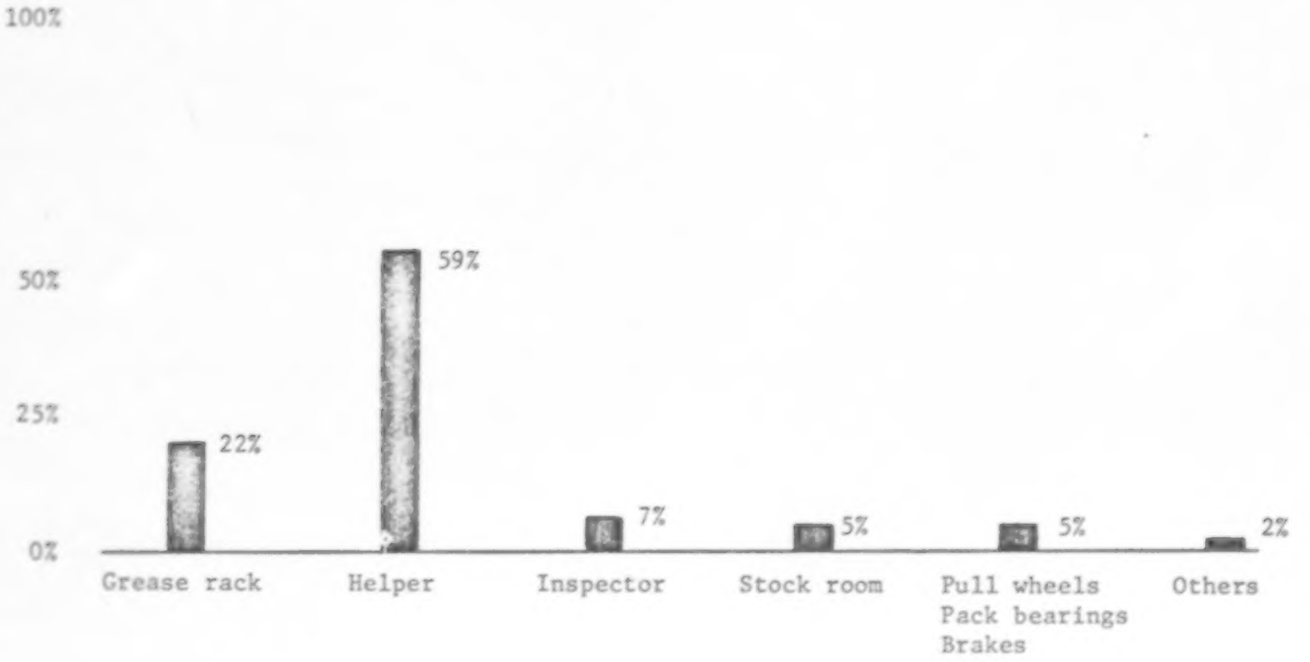
The next ranking of 22% was to start the Apprentice on the grease rack where an opportunity to observe, inspect, and service was given the Apprentice. This gives the Apprentice immediate immersion in shop service and the preventive maintenance aspect of the service department. There is a need of orientation in this area, what to look for, and how serious some of the findings are.

Less popular Apprentice starting points were: inspector - 7%, Stockroom - 5%, Pull Wheels and pack bearings, brakes - 5%, Others - 2%. These may indicate the needs under special conditions applicable to a specific fleet operation.

Questionnaire Results:

Question 6.

Where do you start an Apprentice Truck Mechanic in the shop?



Questionnaire Results

Question #7: What type of outside of shop instruction is received by the Apprentice Truck Mechanic in your shop?

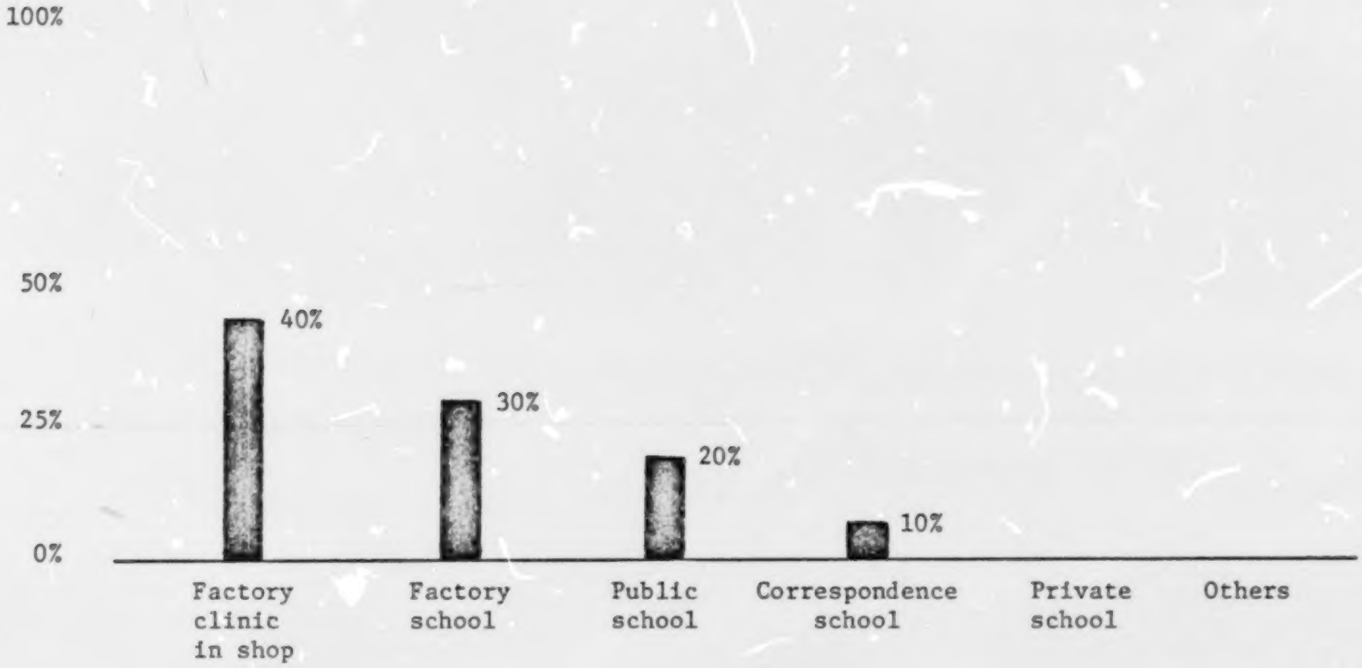
Factory Clinic in shop received 40% rating and Factory School 30% as outside of shop instruction thus showing the current popularity of relying greatly on direct factory training. The Public Schools were at 20% rating as sources of shop instruction for the apprentice. Correspondence Schools received a rating of 10% while Private Schools were at 0%.

Involvement in training of the factory that manufactures the truck equipment is a method of indirect sales promotion. They have a direct interest in seeing that the cost of operation for their vehicles is in the most favorable position. This fosters the belief that a well-trained man can maintain equipment to operate safely at the lowest cost per mile.

Questionnaire Results:

Question 7.

Type of outside of shop instruction received by the Apprentice Mechanic.



Questionnaire Results

Question #8: Can an average Apprentice Truck Mechanic be trained "on the job" to become a first class mechanic in ______ years?

The highest rank of 70% was for a four-year term for the apprentice to complete his training.

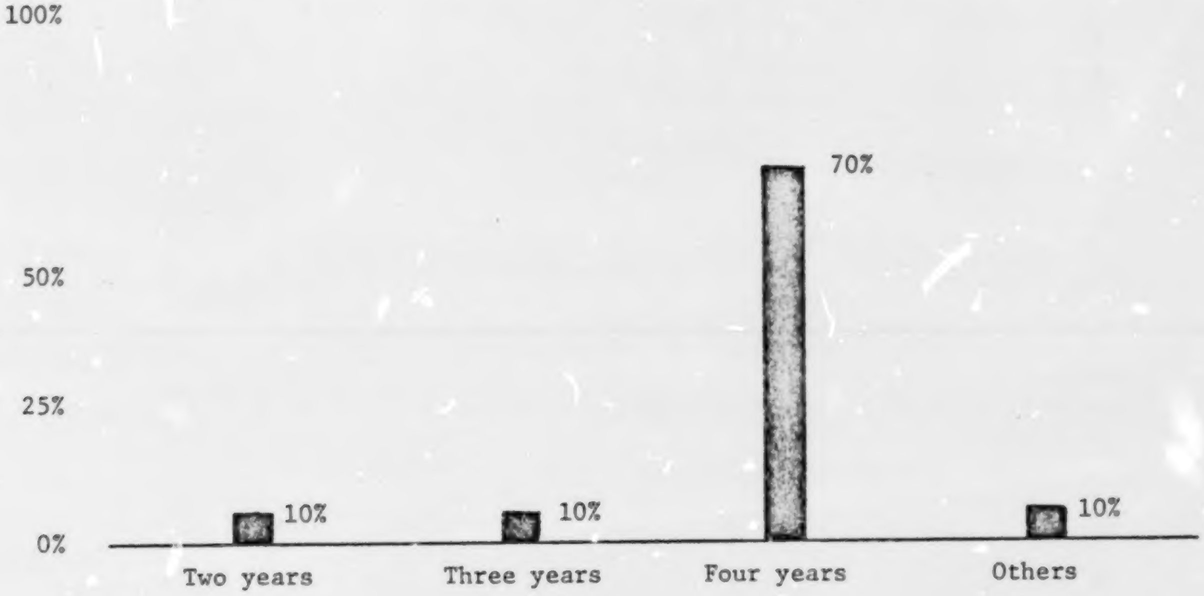
A group (10%) felt that a term of more than four years was needed.

A group (10%) felt that three years was sufficient.

The differences could be rationalized as being due to the greater specialization in some areas while others required a more rounded mechanic as the final product.

Question 8.

Can an average Truck Mechanic Apprentice be trained "on the job" to become a first class mechanic in __________ years?



Questionnaire Results

Question #9: If you were setting up an ideal Apprentice Truck Mechanic training program disregarding cost, would you want:

On-the-job factory instruction?
Public School-industry directed (one day a week)?
Factory school - One day a week?
Private school - tailored instruction?
Others?

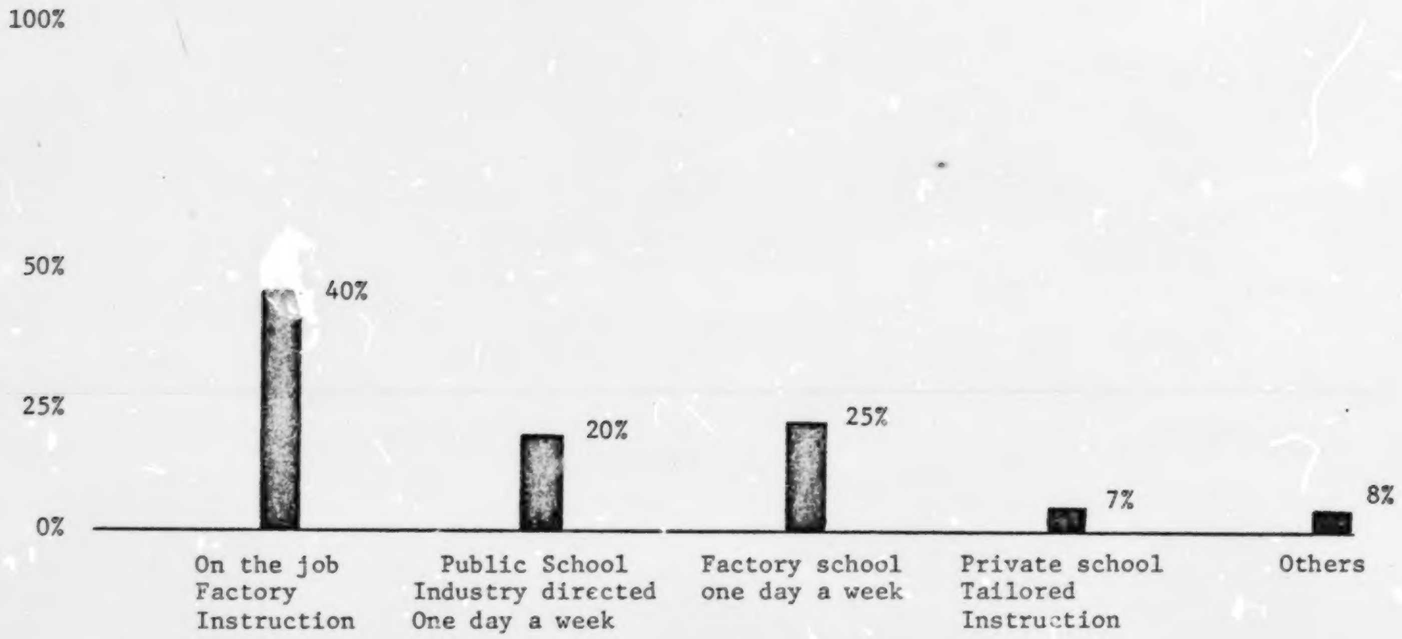
The highest rank of 40% was for "on-the-job factory instruction." The next highest of 25% was for Factory school one day a week. Public school-industry directed-one day a week received a 20% ranking. Private school-tailored instruction received a 7% ranking, while Others received an 8% ranking.

This again points out the importance of specific factory instruction and factory school of 40% and 25% respectively, a total of 65% being for factory-initiated training. An explanation again may be that the manufacturer has a definite stake in the future sales of his product and is encouraged to train people who will make his product perform at its best.

Questionnaire Results:

Question 9.

If you were setting up an ideal Apprentice Truck Mechanic Training program disregarding cost, would you want:



Questionnaire Results

Question #10: What percentage of your shop mechanics came up the Apprenticeship Route--trained in your shop?

The results of this question, 45%, shows a high percentage of mechanics trained in the shop.

Question #11: What percentage of apprentices, upon graduation to a mechanic level, stay on in your shop?

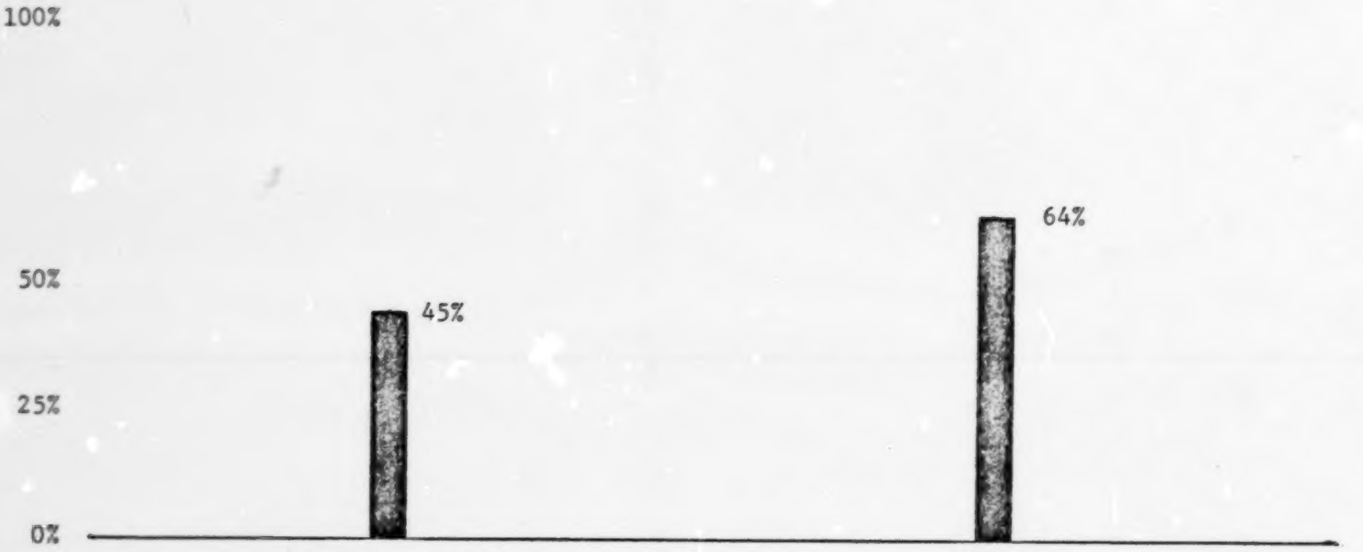
The 64% ranking of apprentices staying on after graduation is a plus for putting stability into shop turnover problems.

Comment can be made on the two joint questions #10 and #11 that the favorable percentages indicate satisfactory results with apprentices, their stabilizing qualities in the shop, and their meeting of performance needs.

Questionnaire Results:

Question 10.
What percentage of your shop mechanics came up the Apprenticeship Route; trained in your shop?

Question 11.
What percentage of Apprentices upon graduation to a Mechanic level stay on in your shop?



Trained in shop
No. 10 - Apprenticeship route Mechanics.
Trained in own shop.

Stay on
No. 11 - Percentage of Apprentice graduates
that stay on in shop.

Questionnaire Results

Question #12: Do you feel that training your own apprentice mechanics is a good way to get loyal, responsible, self-starting and well trained men?

The rating of 91% indicates a strong belief by the operating supervisors in training their own apprentice mechanics.

Question #14: Do you feel that the Trucking Industry is taking full advantage of the potential of the Apprentice Mechanic Training Program?

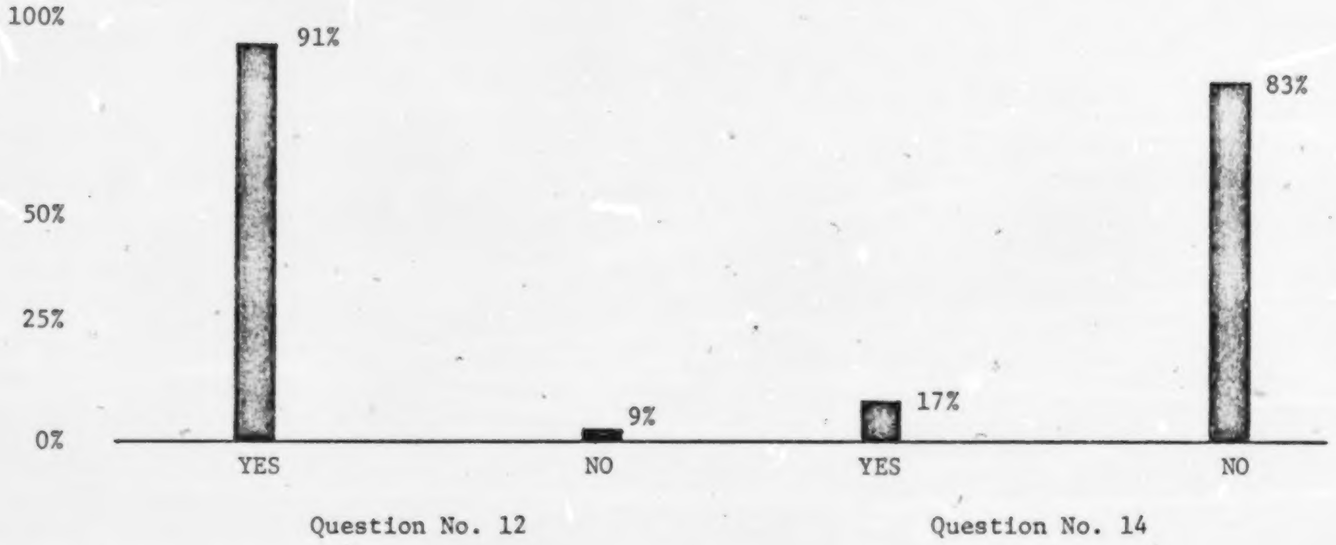
A rating of 83% of "No" as their answer shows the need for additional use of the Apprenticeship Program.

In question #12 the heavy indication for the apprenticeship route is contrasted against that of question #14, indicating the trucking industry is not using the Apprenticeship Truck Mechanic Training even though it is rated highly.

Questionnaire Response:

Question 12.
Do you feel that training your own Apprentice Mechanics is a good way to get loyal, responsible, self-starting, and well trained men?

Question 14.
Do you feel that the Trucking Industry is taking full advantage of the potential of the Apprentice Mechanic Training program?



Questionnaire Results

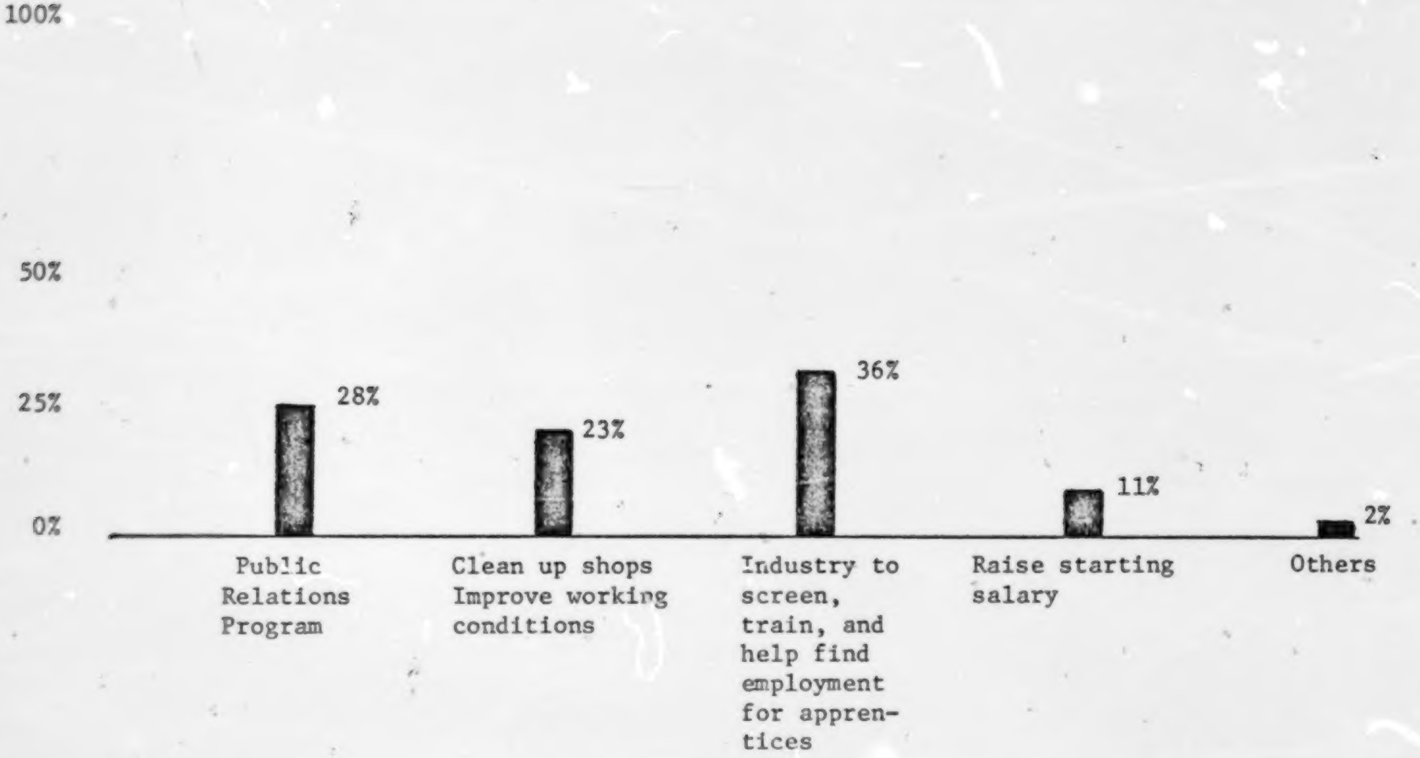
Question #13: How could the Trucking Industry attract qualified Apprentice Mechanics?

The ratings were divided with a 36% to Industry to screen, train and help find employment for apprentices. A public relations program was rated a 28%. A clean-up shops, improve working conditions drew a 23% rating. A raise starting salary drew a 11% rating. Others drew a 2% rating.

Questionnaire Results:

Question 13.

How could the Trucking Industry attract qualified Apprentice Mechanics?



Questionnaire Results

Question #15: If it were possible to establish: a) an industry fund for training, retraining, and upgrading; received a 75% rating for its establishment and 25% against. b) an industry fund to be supervised by a Joint Industry - Labor Committee; received 60% for and 40% against. c) an hourly contribution by the mechanic and apprentice matched by the Trucking Industry to entitle each man to an adequate training as needed, desired and possible: 74% for and 26% against.

This series of questions and the positive high rating indicated the strength of a joint means to establish an industry fund for training, retraining and upgrading of the mechanic and the apprentice. The rapidity of changes in industry and the obsolescence of knowledge and skills forces a realistic evaluation of the problems.

Questionnaire Response:

Question 15.

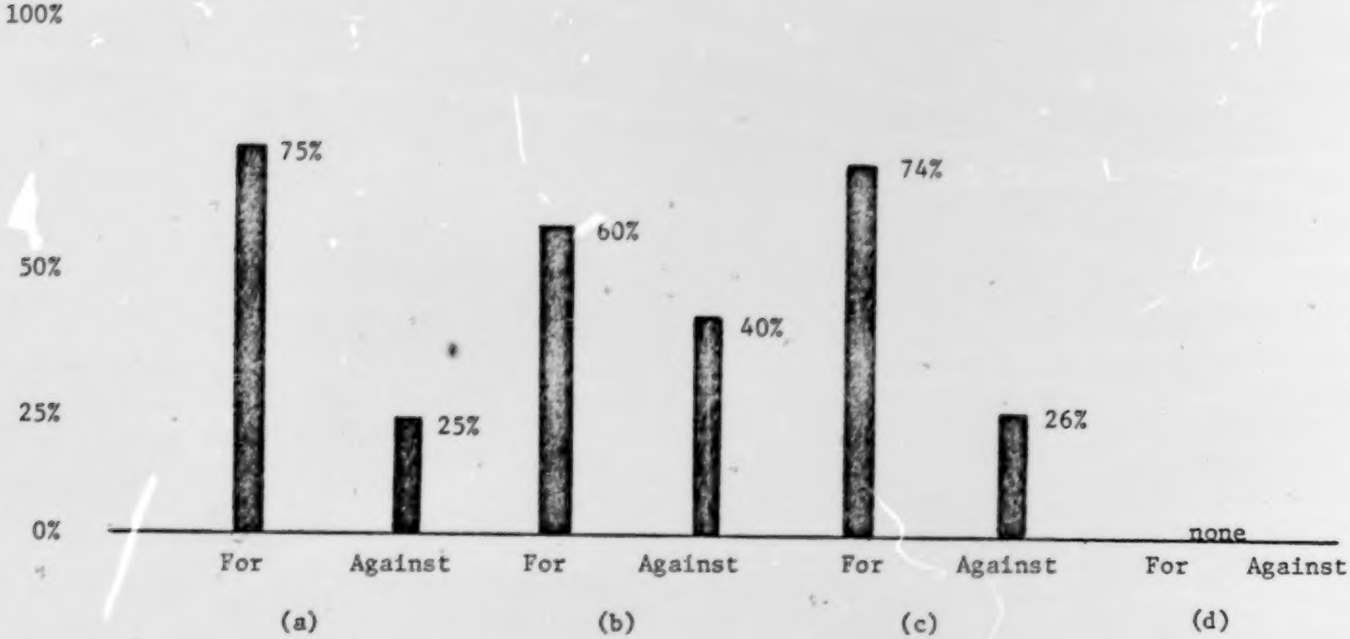
If it were possible to establish:

(a) an industry fund for training, retraining, and upgrading, I would be for ____ against ____.

(b) an Industry Fund to be supervised by a Joint Industry-Labor Committee. For ____ Against ____

(c) An hourly contribution by the Mechanic and Apprentice matched by the Trucking Industry to entitle each man to an adequate training as needed, desired, and possible. For ____ Against ____

(d) Other ______________



Questionnaire Results

Question #16: Do you feel that the truck manufacturers are adequately presenting service information, knowledge, field information and training to upgrade service and maintenance people?

A yes vote of 41% and no of 59% showed that manufacturers still have a long way to go to meet all those needing service and related training. This also should show that the cost per mile of operation created a dissatisfaction which could affect the selection of equipment at purchase time.

Questionnaire Results:

Question 16.

Do you feel that the truck manufacturers are adequately presenting service information, knowledge, field information, and training to upgrade service and maintenance people?

Yes 41% No 59%

Question 17.

Number of vehicles your shops are responsible for:

56835	28013	8907	1269
Trucks	Trailers	Cars	Others

Questionnaire Results

Question #17: Number of vehicles your shops are responsible for:

Trucks	56835
Trailers	28013
Cars	8907
Others	1269
Total	95024

The people having experience and a realization of specific service and repair needs for the above numerous pieces of equipment can point to the corrections needed in training. The ranking of the various answers to questions presented should be given strong consideration at the time of either revising or setting up new programs.

The significant problems identified by the questionnaire can be helpful in directing future training programs. Attempts to shorten the period of training of apprentices seems unrealistic in light of the additional knowledge and skills needed to properly maintain and service the more complex equipment now being manufactured. Stabilizing the training programs along with certification of mechanics will not only improve service operations but will give new confidence and higher standards to the trade.

IV. RECOMMENDATIONS

IV. Recommendations

The problems experienced in Truck Mechanic Apprentice Training can be put into the following order:

1. Economic conditions that determine the need for apprentices.
2. Training facilities that are available and readily accessible to the apprentice. As an example, factory training facilities are available to dealer apprentice mechanics if:
    - a) need exists.
    - b) time is available for the apprentice --that is, he is not on overtime or without incentive to achieve.
    - c) his dealership or company can spare him for his training time and is willing to pay for the training and the time allotment.
    - d) a ready market is available for the apprentice and his skills.

3. Willingness on the part of dealer management and the shop mechanics to take time to teach the apprentice.
4. The willingness of the dealer to "hire" a man less qualified than a journeyman mechanic, who might be a liability to his quality control and insurability rating and possibly his public image and public relations.
5. The willingness of the Mechanics' Union to encourage apprentice training in spite of a recession in business. The rank and file may look upon the apprentice as a threat to their employment. Usually the apprentice is let out first to keep peace in shop operations.

To meet these previous problems there is need of:

1. A recession proof system.
2. A continuing program.
3. A built-in holding reservoir of these qualified in-training apprentices - available for industry at fair wage rates and good training.

This system should have the following effects:

a. Control oversupply.
b. Upgrade mechanics.
c. Upgrade apprentices.
d. Upgrade shop facilities.
e. Make shops more professional. Clean up public

relations.

A benefit that could be realized is a system to upgrade the mechanic who needs refresher courses, finds his job obsolete, or needs education in new methods (such as use of plastics, new materials, changes of construction, legal requirements such as those concerning sound pollution, electronic braking (DOT 121), exhaust-control emission, and mechanic certification). How to achieve solutions may be simple in their basic concepts. One of these concepts is the source of funds. Once the solutions are determined they will need publicity, acceptance and promotion.

One of the better methods of funding is the one available to the G.I. under training entitlement whereby he is paid tuition as well as subsistance during his training period.

The next, though not widespread but incorporated in some contracts, is one where trust funds are set up for training and upgrading the mechanic and the apprentice.

Another is seen in the high school student getting his pre-apprentice training while in high school and then entering into an apprentice program with additional training in a community college. Here he becomes more acquainted with the advanced technician phases as well as the service/management area.

U.S. Government Manpower funded projects have also been helpful; however, the percentage of successful completions is low due to the attempts at training hard-core problem cases. Psychological analyses are needed to help direct efforts to the fields of trainability for these individuals. This, of course, raises objections that regimentation is being done rather than a search for aptitudes and success areas of the individual.

A recognition of the need for a strong search of aptitudes, fields of interest, and success areas is mandatory for successful programs in development of the apprentice truck mechanic.

Additional recommendations can be made as follows:

1. An Apprentice Truck Mechanic Training Program independent of business cycles is needed. An example: What would our present high school program be if it were tied to the business cycle as our apprentice programs are? We provide four years for a high school graduate; an apprentice is subject to the whims of the market.

How to achieve #1 may be the following:

2. Further study and possible application of useable items from such sources as SENA, a successful program in Colombia, South America for training apprentices, retraining and upgrading technicians, and requiring a participatory mandatory fee of 2% from the hourly rate. By being part of the program and having a paid interest the worker can make the greatest use of it. In Colombia, a country of 20 million

people, more than 164,000 people received occupational training by 1966, over a ten-year span. By 1972 there were 1.2 million Colombians trained in its 100 training centers around the country in industry, agriculture and commerce. Colombia was expecting to see its 2 millionth student by 1974. Most students are between 14 and 20 years of age. Special extension courses are also provided for adults.

3. Greater involvement of U.S. Department of Labor, Bureau of Apprenticeship in encouraging programs and their subsidy.

   a. Standardization of training and certification requirements.

   b. Continuing study to further improve types of equipment to be used.

   c. Subsidy - standardization with flexibility to get maximum results.

   d. Establishment of a holding reservoir for trained people with a continuing usage of skills and improvement. It has been suggested that a type of CCC used during the early 1930's to train the young unemployed in roadbuilding, forestry and National Park construction be initiated for the above areas and operation of power equipment and its service.

e. Training of the advanced student for further challenging areas he is capable of handling. This training would go far beyond entry level skills. With today's sophisticated equipment there is a need of able technicians, not only marginal skill people. The field of electronics as applied to braking systems, fuel systems, electrical systems, and communications demands the best that can be had; and it must begin with career people who have the aptitudes, abilities, and physical capability of becoming Apprentice Truck Mechanics.

V. SUMMARY

Summary

In summary, the joint venture of enlightened trucking management, union participation, the blessing of the U.S. Department of Labor, Bureau of Apprenticeship, and the participation of public, manufacturers, and private schools will enable a steady flow of needed apprentice truck mechanics to man the shops and dealerships. This need becomes critical with the growth of the transportation industry, the expansion of our highways, the needed increases in vehicle performance, and the numbers of automobiles on our highways. A serious attack on the problem of highway deaths and safety is of the utmost importance and could result in lower traffic deaths. There were 55,800 traffic deaths in 1973.[51]

Only by a joint, coordinated, and enlightened approach can the problem be solved and a full realization of the potential of Apprentice Truck Mechanic be found with its benefits. Industry, youth destined for their life work, public safety would all be positively affected with great benefit to all.

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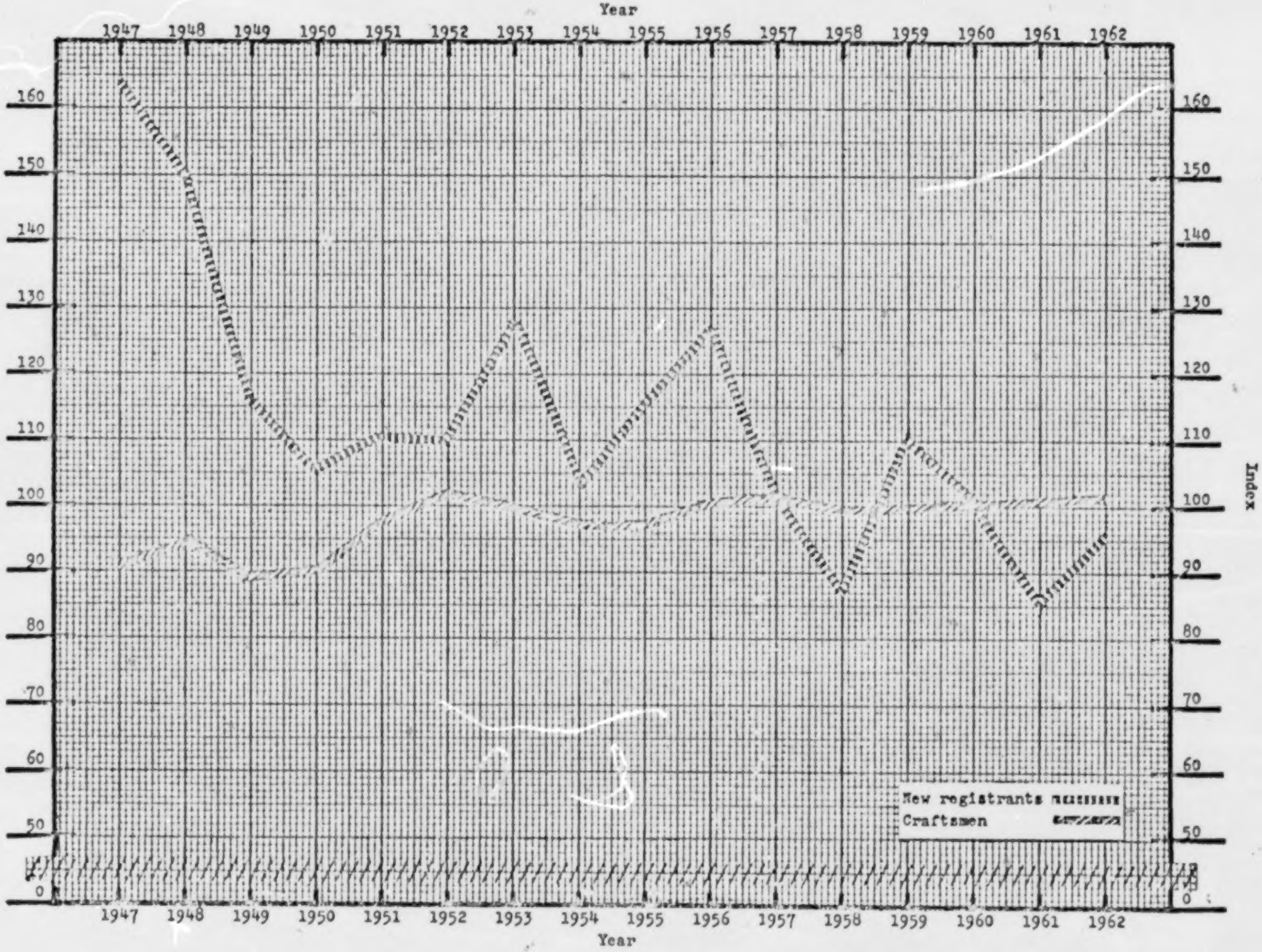
[51] Motor Vehicle Manufacturers' Association, 1975 Automobile Facts and Figures (Detroit, Michigan), p. 45.

VI. APPENDIX

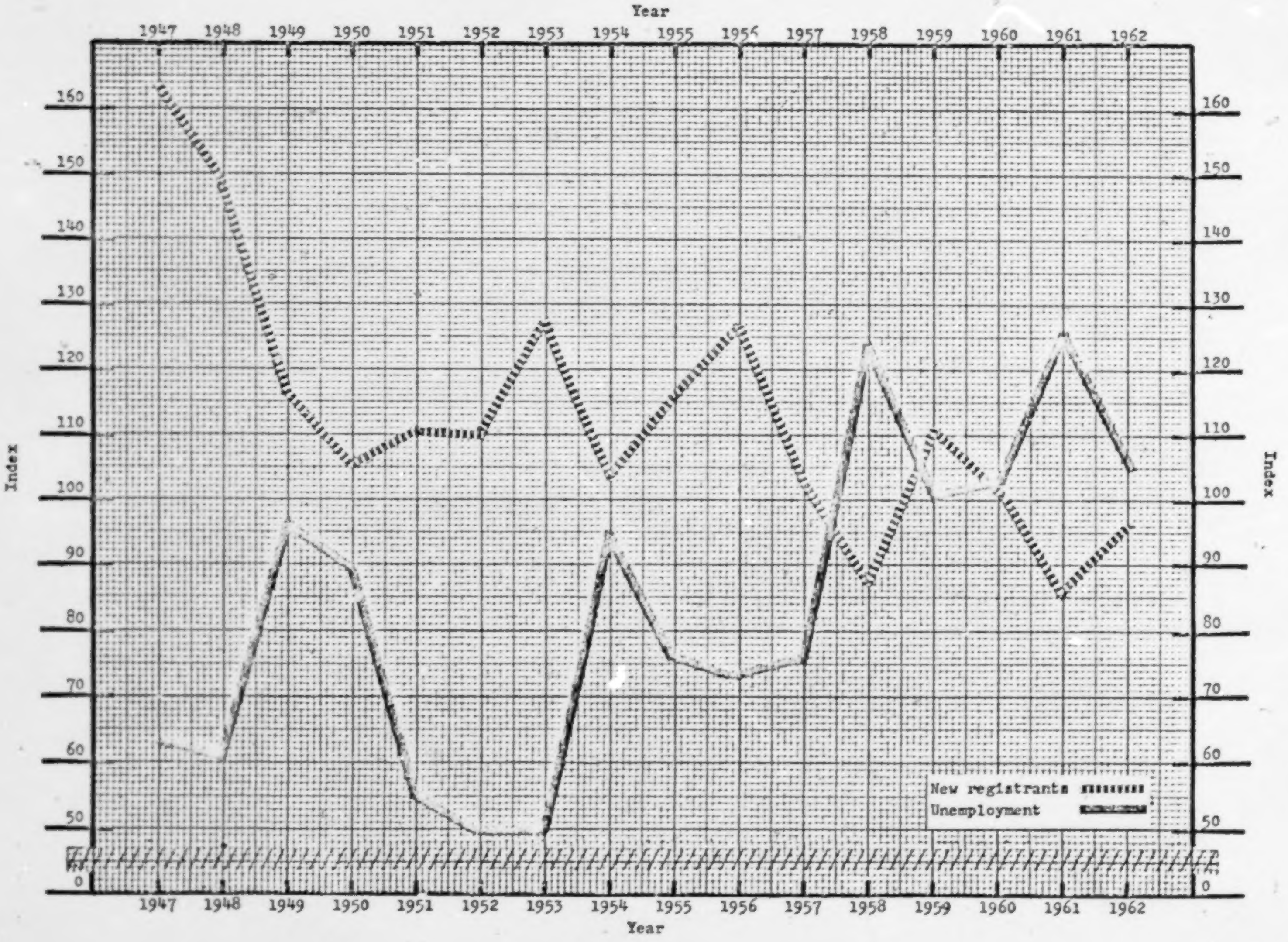
1. Graphs - Four
2. The Machinist - News Article
3. Apprentice Indenture - R.E.A.
4. Apprentice Rating Form
5. Survey Questionnaire - A.T.S.A.

Figure I--Indices of annual average employed male craftsmen and new apprentice registrants, each year, 1947-62 (1957-59 = 100.0)



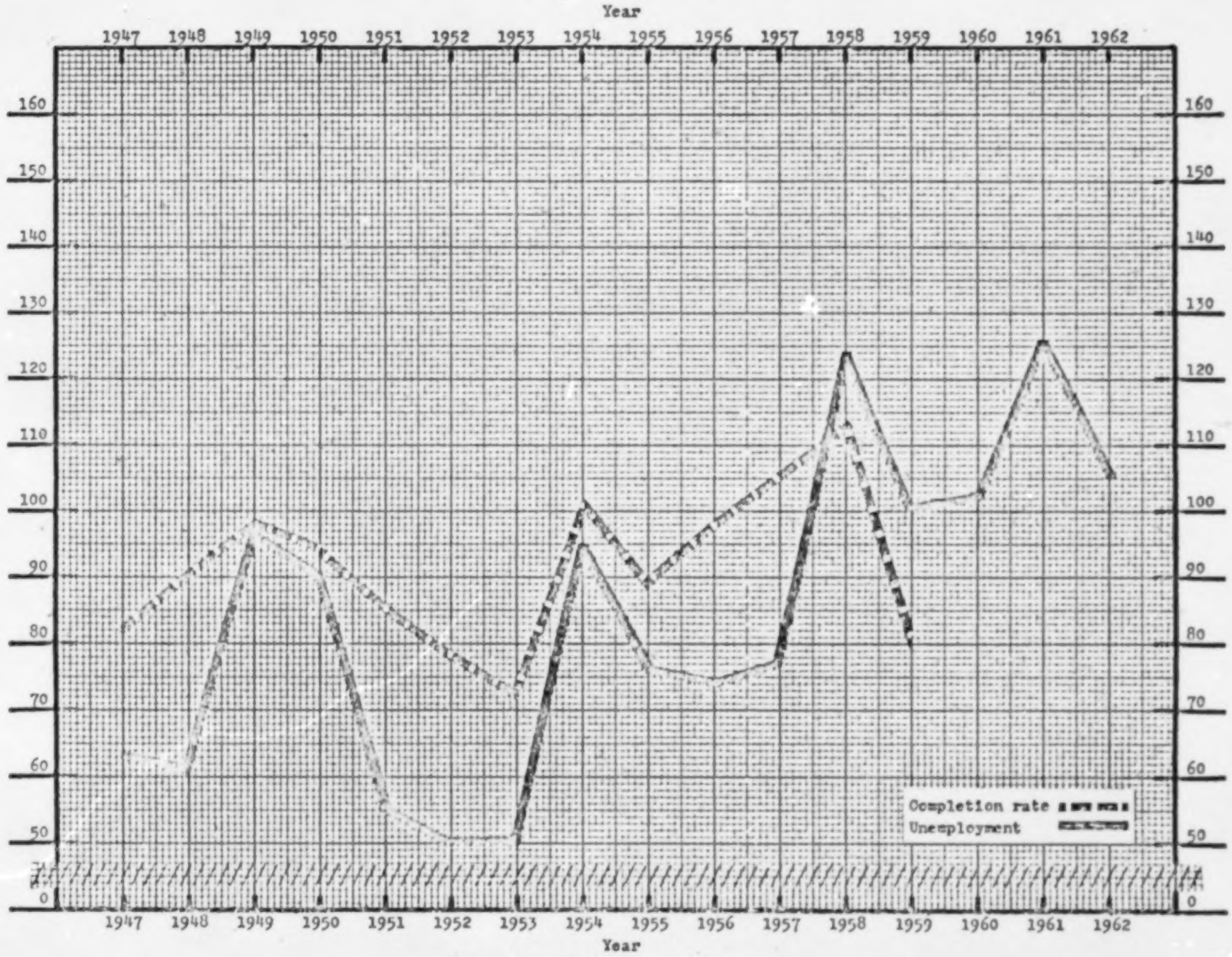
From Apprenticeship and Economic Change, U.S. Department of Labor, 1964.

Figure 2--Indices of unemployment and number of new apprentice registrants, each year, 1947-62
(1957-59 = 100.0)



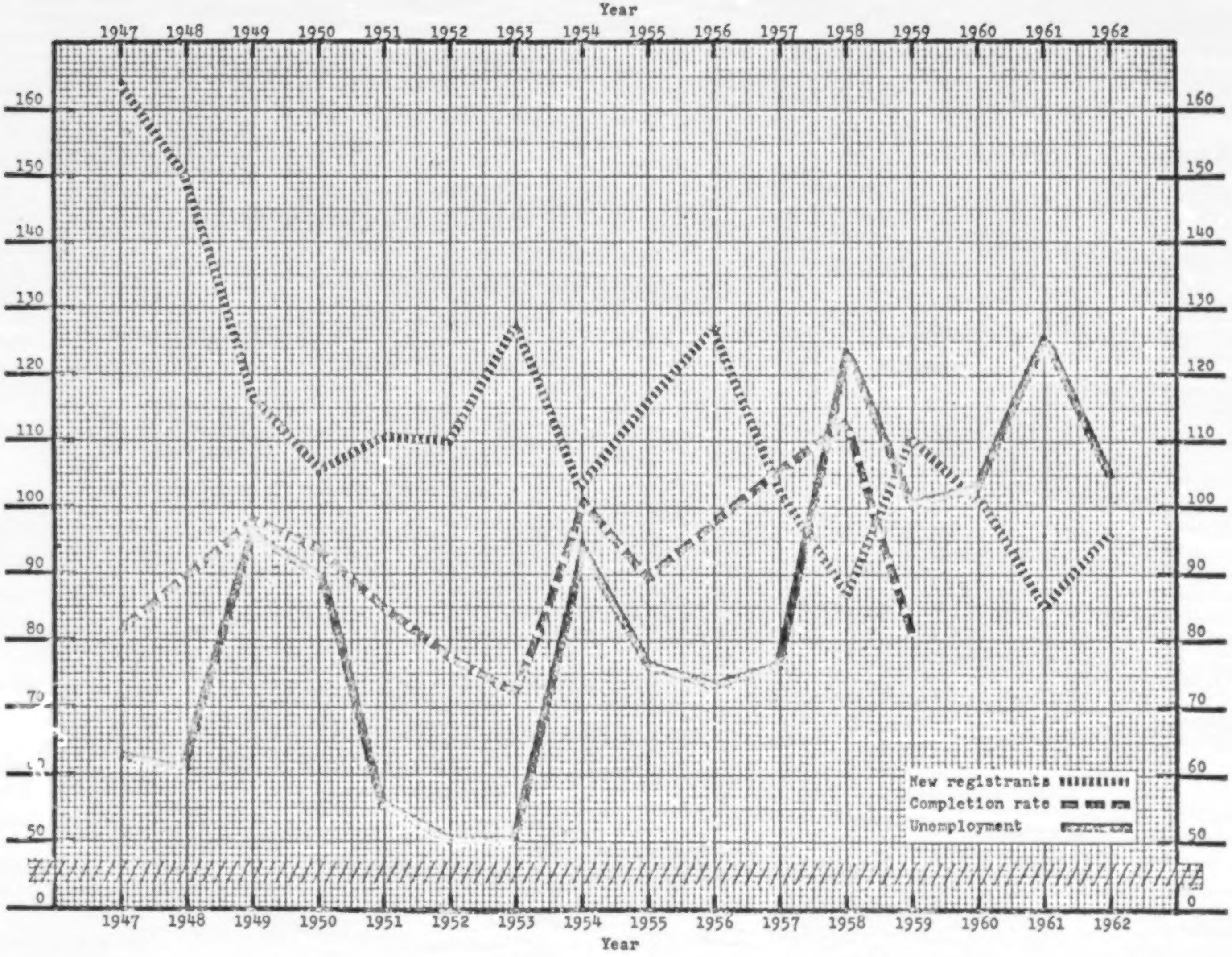
From Apprenticeship and Economic Change, U.S. Department of Labor, 1964.

Figure 3--Indices of unemployment, each year, 1947-62, and of completion rates of new apprentice registrants, each year, 1947-59
(1957-59 = 100.0)



From Apprenticeship and Economic Change, U.S. Department of Labor, 1964.

Figure 4--Indices of unemployment and new apprentice registrants, each year, 1947-62, and of completion rates of apprentices, newly registered, each year, 1947-59
(1957-59 = 100.0)



From Apprenticeship and Economic Change, U. S. Department of Labor, 1964.

Recession Causes Apprentice Drop

Twenty-seven per cent fewer machinist apprentices, five per cent fewer tool and die maker apprentices are learning their trades than were a decade ago, the U.S. Labor Department disclosed last week.

Goshen

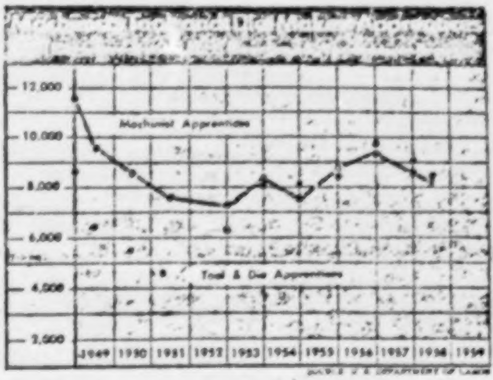
To find out the reasons for the decline THE MACHINIST last week interviewed Ed Goshen, a top official of the U.S. Bureau of Apprenticeship, U.S. Department of Labor.

As executive director of Apprenticeship Service, Goshen can spot the trends. He pointed out that the number of machinist apprentices fell from 11,200 at the end of 1948 to 8,123 last June. Goshen explained:

After World War II, veterans took advantage of the GI Bill to apprentice, and when they became journeymen at the end of the 1940's, the numbers of apprentices fell off.

Then because of the Korean War youths who might have become apprentices entered the armed services instead. After Korea industry gradually began training more apprentices until the 1957-'58 recession. Then apprenticeship dropped off again.

"Dropping apprentices isn't sensible," Goshen explained. "We know we are going to need vastly more skilled manpower in the immediate future. Industry doesn't even have enough apprentices to replace the journeymen who retire or die."



The Bureau's statistics nevertheless show that this loss of apprentices in the recession was general. On Jan. 1, 1957, before the recession began, there were 188,137 apprentices training in 89 crafts. The latest figure shows that as of June 30 last year there were but 178,736.

The real loss might be even greater than the figures indicate, Goshen asserts. But for the recession the number probably would have risen, rather than declined by 9,401.

Over the long run and with the return of prosperity Goshen thinks that industry will return to training more and more apprentices. He affirms: "Apprenticeship has been tested and improved on the hard anvil of time. It has been with us 4,000 years. It is the only way to train craftsmen."

From The Machinist, 1959

R E A EXPRESS

AUTOMOTIVE MECHANICS APPRENTICE PROGRAM
CHASSIS AND BODY

APPRENTICE INDENTURE

THE RAILWAY EXPRESS AGENCY, INC., ______________________________,
(Local Address)
______________________, hereinafter referred to as the "Company,"
(City, State)
and ________________________________, hereinafter referred to as the "Apprentice," have mutually agreed to the following:

1. That the Company agrees to employing said apprentice upon the signing of the "Apprentice Identure" for 6,000 hours (5,000 hours for a helper apprentice) as an apprentice to learn the automotive mechanics trade in accordance with the terms and conditions set forth.
2. That the said apprentice shall diligently and faithfully perform the work required of him by the Company during this period.
3. That the terms and conditions of this apprentice indenture are contained in the attached and bind both parties as part of this agreement.
4. That the apprentice indenture may be cancelled or terminated as set forth in sections "B-3" and "F-4" of the attached.

Signed ______________________________________

This ______________ day of ________________ 19____

R E A EXPRESS

____
Regional Automotive Services Manager

(Revised March 29, 1966)

STANDARDS OF APPRENTICESHIP

A. Qualifications

1. Applicants must be at least 18 years of age and not over 30 years of age. Exceptions in the maximum age limit may be made in the case of applicants who have had previous experience in the trade. They may be granted advanced standings as apprentices, when agreed to in writing by the International Union and the Company.

2. All applicants must have a high school education and are required to take selected mental and mechanical aptitude tests. (Exceptions may be made in the high school requirement in unusual cases where mechanical aptitude has been demonstrated.)

3. Applicants will be admitted to apprentice indenture program on basis of meeting qualifications only.

B. Term of Apprenticeship

1. Length of Course:

   a) The term of regular apprenticeship shall be 6,000 hours, (approximately three years). This shall consist of 5,550 hours of practical work and 450 hours related classroom instruction.

   b) The term of helper apprenticeship shall be 5,000 hours (approximately two and one-half years). This shall consist of 4,625 hours of practical work and 375 hours of related classroom instruction.

2. Classroom Instruction: The hours of classroom instruction in subjects related to the trade shall be scheduled for each apprentice. The apprentice is required to enroll in approved courses and attend regularly 4 hours each week during the scholastic year.

3. Probationary Period: If within six months, an apprentice shows no aptitude to learn the trade, he will not be retained as an

4. Credit for Previous Experience: The Company may grant the apprentice credit for previous indenture training or experience in the motor vehicle mechanic trade acquired before entering the course, shortening the course accordingly, when agreed to in writing by the International Union and Company.

5. Absence: Time lost due to illness, personal reasons, layoff or for other reasons will not be computed in determining the time spent in the course.

6. Upgrading of Apprentices: In exceptional cases the progress of an apprentice may warrant upgrading, i.e., advancing before completion of the required time in a given assignment, when agreed to in writing by the International Union and Company. The advancement may be made only after the apprentice has achieved the required knowledge, and has demonstrated good performance on the job from which he is advanced.

C. Rates of Pay

1. Hourly Rate:

a) The basic starting rate of pay for regular apprentices for the first six months of 1,000 hours' work shall be 70 percent of the journeyman's basic rate of pay at the location employed. Upon the completion of each succeeding six months' period of 1,000 hours' work, such basic starting rate will be increased by 5 percent until it reaches the journeyman's basic rate.

b) The basic starting rate of pay for helper apprentices shall be the existing helper's rate in effect and upon completion of each succeeding six months' period of 1,000 hours' work such basic rate shall be increased by 20 percent of the difference between the starting rate of pay and the journeyman's rate of pay until it reaches the journeyman's basic rate of pay.

These wage rates shall be subject to revisions made necessary by general wage adjustments.

2. The apprentice's work week will consist of 40 hours; 36 hours practical work, 4 hours related to classroom studies.

3. Shortened Course: Apprentices who are given credit for previous experience or who have been advanced shall be paid the wage rate for the period to which such credit advances them.

D. Course Outline

Instructions are carefully scheduled to give the apprentice well-rounded experience in all aspects of the automotive mechanics trade. This includes practical work assignments and related classroom instruction. The apprentice shall be given such experience and instruction in all phases of the trade as is necessary to develop a practical skilled all-around mechanic. The schedule of work experience assignment is to be flexible. The number of hours spent in any assignment will depend upon:

(1) The apprentice's progress and proficiency.

(2) Equalization of work due to operational requirements.

Practical Training Assignments

(1) Inspection and Lubrication.

(2) Chassis, Frame, Springs, Front Axle and Steering Gear.

(3) Brake System.

(4) Clutch and Transmission.

(5) Differential and Drive Line.

(6) Engine Tuneup and Electrical Systems.

(7) Engine Repair.

(8) Welding, Electric Arc and Acetylene Gas.

(9) Cab and Body Repairs.

(10) Mechanical Diagnosis and Testing of all Chassis Components.

Approximate Hours

ASSIGNMENT # 1: Inspection and Lubrication 80

Objectives:

a. To teach methods of detecting vehicle parts in need of attention.

b. To develop an understanding of the importance of proper lubrication.

c. To give the apprentice instructions and experience in determining proper lubricants as called for in lubrication specifications and instructions, in approved methods of greasing, oiling, etc., and operation of hand and power lubricating equipment.

Work Experience:

a. Make visual inspection and note worn, broken or malfunctioning parts on vehicles. Fill out necessary report forms so proper attention may be given to correct defects.

b. Perform the various phases of lubrication, including draining and refilling crankcase, transmission and differential, cleaning and replacement of air cleaner, gasoline filters and oil filters.

Approximate Hours

ASSIGNMENT # 2: Chassis, Frame, Springs, Front Axle and Steer Gear 350

Objectives:

a. To give the apprentice instructions and experience in the function, operation maintenance and repair of chassis frames, wheels, front suspension and steering assembly.

b. The proper use of testing equipment and tools.

Work Experience:

a. Check and align frame members.

b. Disassemble and repair springs, tie bolts, shackles, bushings and spring hangers. Assemble, install and make adjustments.

c. Service, repair and install front end suspension and steering mechanism, rebush spindles, adjust camber and caster to specifications.

ASSIGNMENT # 3: Brake Systems 480

Objective:

a. To give the apprentice instructions and experience in the function, installation, servicing and repairing of brakes and related parts.

Work Experience:

a. Disassemble, inspect, repair the following:

Hydraulic master and wheel cylinders.
Re-line brake shoes.
Hydrovac.
Vacuum diaphragms and air diaphragms.
Vacuum and air control valves.

b. Make necessary tests and adjustments.

Approximat
Hours

ASSIGNMENT # 4: Clutch and Transmission 800

Objective:

a. To give the apprentice instructions and experience in the function, construction, and operation of the conventional clutch, conventional transmission and automatic transmission and related parts.

Work Experience:

a. Disassemble, repair or replacement of the clutch assembly.

b. Disassemble, repair or replace parts of of the conventional transmission.

c. Disassemble, repair or replace parts of the automatic transmission and related parts.

d. Adjust clutch assemblies, conventional and automatic transmission to meet the requirements set forth in specifications provided.

Approxima
Hours

ASSIGNMENT # 5: Differential and Drive Line 240

Objective:

a. To give the apprentice instruction and experience in the function, construction and operation of the differential and drive line assemblies.

Work Experience:

a. Disassemble, inspect, repair, install and adjust rear axle differential assembly, drive shaft universal joints and carrier bearings.

ASSIGNMENT # 6: Engine Tune Up and Electrical Systems 600

Objective:

a. To provide the apprentice with instructions and experience in all phases of engine tune up and electrical inspection, adjustments and testing.

Work Experience:

a. Dismantle carburetor and fuel pump, repair or rebuild, install and adjust.

b. Disassemble, inspect, repair and test, generator and regulator, starter motor and pinion, distributor and coil.

c. Check cooling system for leaks, stoppages, including water pump, hoses, freeze plugs, gaskets, radiator and heater.

d. Check all wiring: Chassis to body wire harness, battery cables, headlights, tail and stop lights, clearance, marker and identification lights. Repair, or replace as necessary and adjust to meet specification requirements.

Approximate Hours

ASSIGNMENT # 7: Engine Repair - Gas and Diesel 1200

Objective:

a. Provide the apprentice with instruction and experience in general engine repair.

Work Experience:

a. Disassemble, inspect, repair, install and adjust engine parts including: Connecting rods and bearings, main bearings, camshaft bearings, oil pump, valves, valve guides, springs, valve lifters, camshafts, timing gears, chains, cylinder sleeves, pistons; rings, wrist pins, cylinder head, oil pan, water distributing jacket and freeze plugs.

ASSIGNMENT # 8: Welding, Electric Arc and Acetylene Gas 960

Objective:

a. To provide the apprentice with instruction and experience in welding, cutting and soldering of ferrous and non-ferrous metals, and its application to the repair of all chassis components, cabs, and bodies.

Work Experience:

a. Determining type and gauge of metal.

b. Application and adjustments of acetylene and oxygen welding equipment. Welding, brazing, cutting, heating and soldering metals.

c. Application and adjustment of electric arc welding equipment, and shrink metal with heat application.

Approximat
Hours

ASSIGNMENT # 9: Cab and Body Repairs 500

Objective:

a. To provide the apprentice with instruction and experience in the repair of cabs and bodies.

Work Experience:

a. Determining gauge of metal.

b. Apply various body repairing tools.

c. Remove dents, re-shape fenders, body sections; remove and replace body panels

d. Shrink metal with heat application.

e. Weld, braze, solder body panels.

f. Prepare surface for painting. Prime, paint and apply decalcomania signs and lettering.

Approximate Hours

ASSIGNMENT # 10: Mechanical Diagnosis and Testing of all Chassis Components 340

Objective:

a. To provide instruction in diagnosing trouble and the proper use of testing equipment.

Work Experience:

a. Perform tests assigned, emphasizing advanced and more complex work.

Related Classroom Instructions

Throughout the apprenticeship course, the apprentice will be required to complete course study in subjects related to his trade. This will be accomplished in approved community vocational schools, home study or correspondence courses. Classroom instructions as set forth in Section C, Item 2, are scheduled for each apprentice and shall be paid for. All other courses, home study and correspondence courses will not be compensated for, except those authorized under the Company's Tuition Refund Plan and in accordance with the terms thereof.

Objectives:

a. To instruct the apprentice in related subjects which will enable him to acquire technical knowledge necessary to perform the duties of an automotive mechanic.

b. To give the apprentice an adequate understanding of related instruction to actual shop practice.

c. Time spent on each subject will be governed by the course subject as provided by the school. Assignments of subjects are to be scheduled as near as possible so they will coincide with the practical training assignments. Related classroom instruction is to consist of the following subjects:

1. Chassis, Elementary
2. Front End and Wheel Alignment
3. Automatic Transmissions
4. Carburetor Ignition and Engine Tune Up
5. Engine, Elementary
6. Auto Body and Fender Repairing and Painting
7. Electric Arc and Acetylene Welding
8. Mechanical Drawing and Blue Print Reading

E. Administration

The administration of the apprentice program is the responsibility of the Regional Automotive Services Manager in conjunction with the Joint System Apprentice Committee. Supervision of the apprentice standards is the responsibility of the local automotive supervisor. Record forms are provided and are to be maintained indicating the apprentice's performance.

Semi-annual reports are to be submitted to the Director, Automotive Services as to the apprentice's progress and proficiency in the following, with copy to the Union Business Representative:

a. Practical work assignment
b. Related classroom instruction
c. Number of hours spent in each assignment

F. General Provisions

1. Compliance with Rules: The apprentice shall in the performance of his duties be required to abide by the applicable rules and regulations of the Company.

2. Hand Tools: The apprentice shall furnish and pay for the hand tools needed to learn his trade. However, on successful completion of apprenticeship, he shall be reimbursed for tools purchased up to $100.00, provided appropriate receipts are submitted.

3. Text Material: The Company will furnish the apprentice service manuals and other text material he requires throughout the course. The apprentice may be required to purchase other text books and references.

4. Layoff: When reduction in forces is necessitated by business conditions, apprentices will be laid off in proportion to the number of journeymen laid off. The apprentice with the least seniority will be laid off first and in the event of re-employment the apprentice with the longest service will be first eligible in accordance with the provision of the applicable labor agreement.

5. Joint Apprentice Committee: A systemwide committee, consisting of three Company representatives and three from the International Union, will resolve any or all policy problems dealing exclusively with the administration and furtherance of the apprentice training program.

Depending upon size of garage, similar sub-committees will be instituted on a local basis with equal representation.

The Chairmanship and the Secretary's offices will rotate on a quarterly basis.

6. The ratio of apprentices to journeymen will be determined as follows:

   a. Each shop, where at least three mechanics are employed, is entitled to one apprentice.

   b. Also, one apprentice may be employed for every five additional mechanics.

7. To assure well-rounded experience and training, apprentices may rotate, as required, within their seniority district from shop to shop.

8. As needed, an interested mechanic instructor may be selected from the journeymen to assist in the training of apprentices.

G. Recognition For Successful Completion

Certificates of Completion of apprenticeship from the Bureau of Apprenticeship and Training will be awarded by the Director, Automotive Services in conjunction with the International

Association of Machinists, for all apprentices who successfully complete their apprenticeship under this program.

H. Advancement To Journeyman Status

Based on completion of his apprenticeship, his seniority and the availability of work, the employee shall be assigned as an automotive mechanic and assignment made in accordance with the provisions of the applicable labor agreement.

Nothing in this indenture or in the apprenticeship program shall conflict with the existing agreement between the parties, or subsequent amendments thereto.

(Revised March 29, 1966)

R E A EXPRESS

AUTOMOTIVE MECHANICS APPRENTICE PROGRAM
CHASSIS AND BODY

APPRENTICE INDENTURE

THE RAILWAY EXPRESS AGENCY, INC., ______________________________,
(Local Address)
______________________, hereinafter referred to as the "Company,"
(City, State)
and ______________________________, hereinafter referred to as the "Apprentice," have mutually agreed to the following:

1. That the Company agrees to employing said apprentice upon the signing of the "Apprentice Identure" for 6,000 hours (5,000 hours for a helper apprentice) as an apprentice to learn the automotive mechanics trade in accordance with the terms and conditions set forth.
2. That the said apprentice shall diligently and faithfully perform the work required of him by the Company during this period.
3. That the terms and conditions of this apprentice indenture are contained in the attached and bind both parties as part of this agreement.
4. That the apprentice indenture may be cancelled or terminated as set forth in sections "B-3" and "F-4" of the attached.

Signed ______________________________________

This ______________ day of ________________ 19____

R E A EXPRESS

____
Regional Automotive Services Manager

APPRENTICE RATING FORM

To Employer or JAC

Date ______________________, 19__

Below is the rating for the period from ______________ to ______________, 19 __

For ______________________________ (Name of Apprentice) Trade ______________________________ (Title of Occupation)

DIRECTIONS: Consider the apprentice and the qualities he has shown throughout the whole of this grad ing period. Compare him with other apprentices, if possible. Place a check somewhere on the grading line placing it in a position to show how you would classify this employee.

I. MECHANICAL OR PRACTICAL SKILL

Consider here the ability of this employee to maintain the type of workmanship you would expect from one in his year of training. Consider the amount of work he accomplishes.

Exceptionally expert and quick	Very good	Average ability	Barely satisfactory	May develop	Unsuited, Handicapped

II. INTELLIGENCE DISPLAYED

Consider his ability to learn new methods; the ease with which he follows directions; his success in going ahead with a task without being told every detail; his ability to make practical suggestions.

Very exceptional inteligence	Learns new work with ease	Understands instructions readily	Barely adequate	Slow to learn	Utterly incompetent.

III. INTEREST IN WORK

Consider here if the employee shows a desire to learn. Is he willing to inconvenience himself in order to learn; does he show enthusiasm about his job; or does he appear bored and lacking in interest in his work?

Keen, eager	Alert	Average interest	Often needs prodding	Day-dreams Lacks drive	No interest in this work

IV. CONDUCT

Consider here promptness; obedience to instructions; cooperativeness; willingness to do assigned tasks.

Sets fine example	Well behaved	Average. No criticism	Borderline	Deserving criticism	Insubordinate. Sulky

---

(Name of Company or Program)

____

Rated by ______________________________ (Supervisor or Foreman)

Reviewed by ______________________________ (Employer or JAC)

From Madison Vocational and Adult School, Madison, Wisconsin.

March 11, 1971

To All A.T.S.A. Members:

The attached questionnaire is for research purposes only. No individual's answers will be revealed--only group total reaction in percentages will be used.

The success of this control group questionnaire depends on each one's participation. Please fill out your questionnaire based on your practical experiences and conclusions.

Please fill out the questionnaire before leaving the meeting tonight. Your cooperation is urgently sought to make this survey a success. Responsibility for the questions is solely my own.

In an emergency, please mail in the questionnaire to me within a week. Percentage results will be available to you.

Thank you,

Henry R. Cernota

P.S. Any suggestions you may have are welcome.

Questionnaire:

1. What do you look for when hiring a prospective Apprentice Truck Mechanic? Rate in importance by 1, 2, 3, etc. in ( ).

   A. ( ) Experience
   B. ( ) Physical size
   C. ( ) Knowledge
   D. ( ) Skill
   E. ( ) Interest
   F. ( ) Attitude
   G. ( ) Aptitude
   H. ( ) Initiative
   I. ( ) High school diploma
   J. ( ) Other ____________________

2. What characteristics do you expect in a Truck Mechanic? Rate in importance by 1, 2, 3, etc. in ( ).

   A. ( ) Ability
   B. ( ) Quality of work
   C. ( ) Initiative
   D. ( ) Experience
   E. ( ) Getting along with others
   F. ( ) Attitude towards work, shop, fellow employees, and company
   G. ( ) Other

3. How have you arrived at your ratings for the above questions?

   A. ( ) Through personal observation
   B. ( ) Through Employment or Personnel Dept.
   C. ( ) Personal testing
   D. ( ) Interview
   E. ( ) Supervisor's ratings
   F. ( ) Others ____________________

4. Have you been successful in your personal ratings of Apprentices?

   A. ( ) 100% of the time
   B. ( ) 90% of the time
   C. ( ) 80% of the time
   D. ( ) 70% of the time
   E. ( ) 60% of the time
   F. ( ) 50% of the time
   G. Other ____________________

5. Do you feel that better testing and screening is needed to help select career minded Apprentice Truck Mechanics?

   ( ) Yes ( ) No ( ) Others ____________________

6. Where do you start an Apprentice Truck Mechanic? List in preferred order. Rate in importance by 1, 2, 3, etc. in ( ).

   A. ( ) Grease rack

   B. ( ) B.P.M. Inspector

   C. ( ) Stock room

   D. ( ) Helper to a mechanic

   E. ( ) Pull wheels - pack bearings brake jobs.

   F. ( ) Others ____________________

   ____

7. What type of outside of shop instruction is received by the Apprentice Mechanic in your shop?

   A. ( ) Public School

   B. ( ) Private School

   C. ( ) Factory School

   D. ( ) Correspondence School

   E. ( ) Factory Clinic in shop

   F. ( ) Others ____________________

   ____

8. Can an average Apprentice Truck Mechanic be trained "on the job" to become a first class mechanic in:

   A. ( ) Three years

   B. ( ) Two years

   C. ( ) Four years

   D. ( ) Others ____________________

9. If you were setting up an ideal Apprentice Truck Mechanic training program, disregarding cost, would you want:

   A. ( ) On the job training - factory instruction

   B. ( ) One day a week - away from shop in a centrally located public school facility. Industry directed and programmed.

   C. ( ) Annual one or two week factory schools.

   D. ( ) A private school with tailored instruction - one day/week.

   E. ( ) Others ____

   ____

   F. ( ) Combination A, B, C, D - circle preference.

10. What percentage of your shop mechanics came up the Apprenticeship route; trained in your shop? ____________________

11. What percentage of apprentices upon graduation to a mechanic level, stay on in your shop? ________________

12. Do you feel that training your own apprentice mechanics is a good way to get loyal, responsible, self-starting, and well trained men?

( ) Yes ( ) No ( ) Other ____________________

13. How could the Trucking Industry attract qualified Apprentice Mechanics? Rate in importance by 1, 2, 3, etc. in ( ).

A. ( ) A public relations program telling of opportunities and benefits of a Truck Mechanic Apprenticeship.

B. ( ) Clean up shops, improve working areas and equipment, and improve general working conditions.

C. ( ) Set up an industry sponsored program to attract, screen, train, and help find employment for qualified apprentice mechanics.

D. ( ) Raise starting salary.

E. ( ) Others ____

14. Do you feel that the Trucking Industry is taking full advantage of the potential of the Apprentice Mechanic training program?

( ) Yes ( ) No If No, what do you suggest?

____

15. If it were possible to establish:

A. an Industry Fund for training, retraining, and upgrading of both mechanics and apprentices.

I would be: for ______ against ______

B. The Industry Fund to be supervised by a Joint Industry-Labor Committee.

I would be: for ______ against ______

C. an hourly contribution by the mechanic and apprentice to be matched by the trucking industry to entitle each to an adequate training as needed, desired, and possible.

I would be: for ______ against ______

D. Other ____

16. Do you feel that the Truck Manufacturers are adequately presenting service information, knowledge, field modification, and training to upgrade service and maintenance people.

( ) Yes ( ) No

17. Number of vehicles your shops are responsible for:

__________ Trucks

__________ Trailers

__________ Cars

__________ Others

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